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Utilizing Farm-grown Timber. Provision of Fencing Material and Fuel.

P. S. SYME, Instructor in Agriculture, Warkworth.

IF, as it is said, "we never miss the water until the well runs dry," many of the older generation must now look back with regret to the "good old days" when excellent fencing-timber was to be found in profusion almost along the line of the fence itself. These days are fast vanishing with New Zealand's native bush. The puriri and the broad-leaf are all but exhausted, and the totara, even now scarce, is year by year becoming increasingly expensive. Soon its price must prohibit its use for general fencing purposes.

For most farmers the fencing problem, already difficult, is now becoming acute, and the day of the substitute cannot be far distant. Reinforced-concrete posts or iron standards are expensive, and though the development of the electric fence may ease the problem to some extent, fortunate is the man whose farm can show a belt of well-grown macrocarpa trees. Originally planted on many farms as wind-breaks or shelter-belts, this quick grower soon becomes a giant, and while a few of them will continue to serve a useful purpose in providing shade, too many mature trees may result in a waste of valuable ground.

Uses for Macrocarpa.

Although in no way comparable to totara for durability, macrocarpa posts

The days when excellent fencing-timber was to be found in profusion almost along the line of the fence itself are passing, and the farmer has now to consider the utilization of farm-grown timber for this purpose. The writer discusses an effective method of providing both fencing material and fuel from this source.

and strainers can still compete if produced by farm labour from farm timber, as their low cost compensates to some extent for their inferior lasting qualities. In addition to providing useful fencing material, well-grown trees will also supply a wealth of excellent fuel from the bent or twisted wood and the smaller side branches.

If such timber is to be exploited economically, however, it must be expeditiously handled, and this can only be done if the work is performed methodically and free use is made of labour-saving appliances.

Felling a Tree.

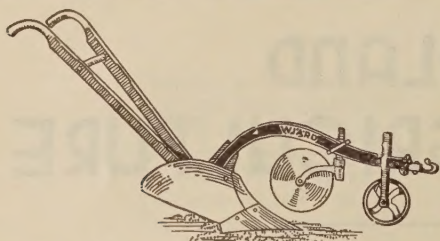
In felling a tree a scarf is first cut on the side to which the tree is to fall, and the cut is then completed by means of the saw working from the opposite side. Before proceeding to cut the tree into lengths a careful examination should be made in order to decide how the timber can be utilized to best advantage with a view to providing the maximum number of gate-posts, strainers, stays, posts, and battens. When this has been decided the sections can be sawn at the appropriate places, wedges being used where necessary to ease the passage of the saw. The saw should be fitted with a detachable handle, as withdrawal sometimes presents difficulty when working heavy timber.

Macrocarpa can be easily split provided the grain is straight, and it is usual to bore a single charge hole near the middle of the log down to its centre, using a 1½ in. auger. The quantity of blasting-powder should be proportioned to the size and toughness of the log—if too much is used excessive shattering may result in damaging and wasting timber. The amount of powder and the best place to lay the charge can best be learned by experience.

Placing the Fuse.

When a charge of powder has been poured into the hole a length of fuse is

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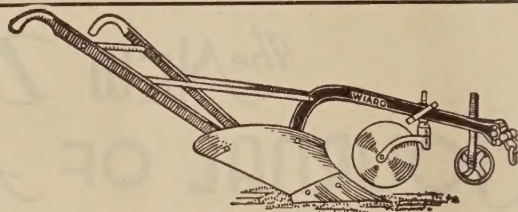
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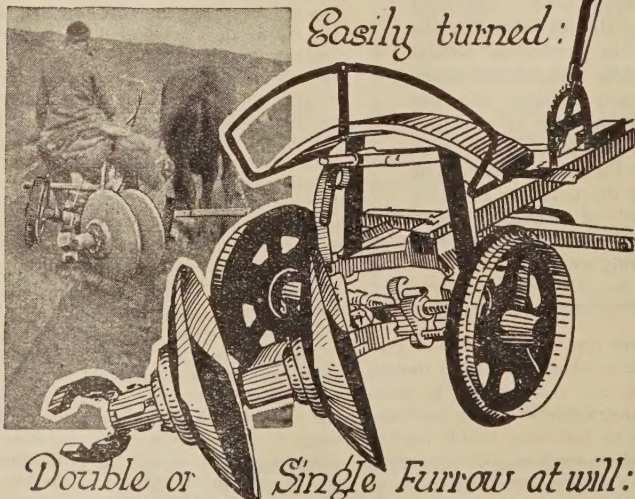
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Fig. 1.—(1) Start with a good sharp axe. (2) Cutting the scarf. Both the tool and man must be in good condition. (3) Sawing the log into post lengths. A wedge is being inserted to ease the saw. (4) Placing the charge in the holes. (5) Tamping the charge.

then inserted and the hole is carefully tamped by driving in a wad of paper and following this with dry earth or sand. The tamping stick and mallet should be made of wood, and the hole should be gradually packed by introducing small quantities of earth and tamping alternately, care being taken not to use

excessive force, particularly in the early stages of the operation.

Before the fuse is lighted the end should be split to expose the powder. The fuse burns at the rate of about 2 ft. per minute, so that an ample margin should be allowed for safety. When the explosion occurs the splinters are mostly thrown out at

right angles to the section rather than towards the ends, and this should be kept in mind when taking shelter.

Life of Farm-grown Timbers.

Some care is necessary in deciding the best direction of split in order to split the wood cleanly and at the same time get the most out of the section. Usually the timber will split easier if the wedges are inserted at the thin end and "down" the tree.

There is considerable difference of opinion among farmers regarding the effective life of farm-grown fencing-timbers. For macrocarpa this is variously given as from five to twenty years or more, but much depends on the quality of the wood and whether or not it has been properly seasoned before being used. Soft sap-wood at its best is of little value for any but temporary fences, but well-seasoned heart-wood will last sufficiently long to justify its use even for permanent fences.



Samples for Chemical Analysis.

Chemistry Division.

THE attention of farmers and others is drawn to the necessity for the correct sampling of materials forwarded to the Chemical Laboratory. A case has recently arisen where a material difference of composition has been demonstrated in two samples of burnt lime taken respectively by a farmer and an Instructor in Agriculture.

It is essential both in fairness to lime-manufacturers and in order that the interpretation of results of chemical analysis may be reliable that samples of lime and other materials should be truly representative of the whole bulk.

Briefly, portions should be taken from a number of the packages or bags, care being taken that a more representative sample than merely the material from the top of the bag is included. These portions are thoroughly mixed together and quartered down as follows: The pile is divided into four quarters, the opposite corners are discarded, the remaining two mixed together, and the process repeated until a 2 lb. or 3 lb. sample remains.

In connection with the analysis of liming materials, forms of application, which give instructions for sampling, are obtainable from Instructors in Agriculture or from the Chief Agricultural Chemist.



Fig. 2.—The explosion.



Fig. 3.—Completing the split.

Combating Canine Distemper.

Symptoms and Methods of Treatments.

G. K. L. KNOTT, M.R.C.V.S., Veterinarian, Canterbury.

CRITICISM may be offered that canine distemper should be discussed in a *Journal* of this nature, but it is hoped that it will be of interest and assistance to those who own working dogs—sheep-farmers in particular. Without doubt distemper is the greatest menace in the dog world. Serious losses and inconvenience are incurred through its spread, and dogs which recover from its attack seldom regain normal health and vigour. In short, the seriousness of this disease cannot be overemphasized. Every owner who has been unfortunate enough to have experienced an outbreak among his team of dogs will be in agreement on this point.

The frequency of the disease among dogs, its world-wide occurrence, and its importance are well illustrated by the fact that it is known in almost all languages as "the dog disease." In Europe it is supposed to have occurred since the middle of the eighteenth century, having been introduced from Asia or Peru. Its infectious nature was proved in the middle of the last century by experiments of transmission, using the discharges of affected animals. In 1905 Carre, during the course of experiments, came to the conclusion that the disease was due primarily to an ultra-visible organism, or virus. This was confirmed by the work of Laidlaw and Dunkin in 1926, who have clarified the position very satisfactorily.

Invasion by Bacteria.

This virus sets up a primary fever catarrh, and debility, and thereby permits the invasion of various organs by a variety of bacteria which are more or less normal inhabitants of the dog's body. These bacteria are called and act as "secondary invaders," for it is by the dissemination of the "primary virus" that the disease is spread, and without it true distemper cannot be set up. The more obvious symptoms exhibited during the disease are due, in the main, to these "secondary invaders," and thus it is understandable why distemper should take different forms—e.g., abdominal form, pneumonic form, &c.

All canines are susceptible, as also are ferrets. The latter are used as experimental animals in the study of the disease. Young dogs are more susceptible

Good working dogs are worth more than mere money. Not only should every effort be made to prevent canine distemper, but the cost of immunization, which is not excessive, should be regarded as a sound policy of insurance. Owners of dogs are warned, however, against the use of questionable remedies and treatments, and are urged to use only recommended methods.

than older dogs, because older dogs have often acquired an immunity from a previous attack. It is unusual for a dog to contract true distemper more than once. Puppies of only a few weeks old have been seen suffering from the disease, but the most dangerous age is from three months to one year old.

Usually an Epidemic.

Any condition which is liable to reduce the resistance of the dog, such as exposure to inclement weather, overwork, poor feeding, or unsuitable accommodation, is liable to predispose to infection. This is borne out by the rapidity with which

it often spreads among musterers' dogs working under extremely arduous conditions.

The disease usually occurs as an epidemic covering a large area, and, needless to say, its spread is greatly facilitated by the congregating of dogs, such as occurs at sales, dog shows, &c.

The period of incubation—that is, the time elapsing between the contracting of infection and the first noticeable symptoms—under natural conditions is from three days to three weeks, the average being ten days. Under experimental conditions it is four days. The duration of the disease is variable, depending on its course and severity.

Symptoms.

The first symptoms are, unfortunately, not usually observed by the owner, because they are neither very obvious nor definite. Usually there is some slight depression—the animal is just "off colour." He will still obey commands and work, but without his usual zest. The appetite is usually reduced, and there is a slight moisture from the nostrils. If the temperature is taken it will be found to be elevated three or four degrees (normal for dog 101½°). Commonly, there are small, flat pustules ¼ in. to ½ in. in diameter present on the hairless skin inside the thighs and elbows. If the eyelids are everted they will appear very watery.

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Later the discharges from the eyes and nose become more profuse and thicker, and often the nose and lips become cracked and the breath offensive. These may be the only observable symptoms for several days, and they are due really to the action of the "primary virus." From this stage onwards a variety of symptoms may arise. They will be caused, in the main, by the action of the "secondary invaders," and will depend upon which organ or organs are being attacked by these latter.

A dog usually shows the symptoms of two or more forms at once—e.g., nervous and abdominal. For convenience it will be best to describe the various forms encountered—namely, abdominal, respiratory, cutaneous, and nervous (the nervous form is not due to the "secondary invaders" but to the poisonous action of the "primary virus" itself).

(1) The Respiratory Form.

The name of the bacterium which acts as the most important "secondary invader" in the respiratory tract is *Brucella Bronchiseptica canis*, and it causes nasal catarrh, pneumonia, and sometimes pleurisy. This form is recognized by the laboured breathing, the head being extended and nostrils dilating and contracting during each breath, and, in

advanced cases, the cheeks also. At first there is a dry cough, and later this becomes moist. Respirations become accelerated and shallow.

If pleurisy sets in there is pain over the chest wall, and if the dog is picked up it generally sets up a fit of coughing. Later there is less pain, but inspiration becomes more difficult. In this form the eyes are often affected also, a "film" developing over the eyes, and an ulcer may form, with great impairment of sight, which may be permanent. The condition is accompanied by severe loss of weight.

(2) The Abdominal Form.

The internal complications of distemper are mainly caused by small coliform bacilli acting as "secondary invaders." The symptoms are those of considerable thirst and the vomiting of a yellowish slimy material. Constipation may be evident at first, but diarrhoea soon sets in. The mouth and teeth often become coated with a brownish slime, which is very offensive. Almost invariably the teeth are permanently damaged, and one can often tell if a dog has had distemper by examining the teeth.

The abdominal form is accompanied by very rapid loss of condition, and,

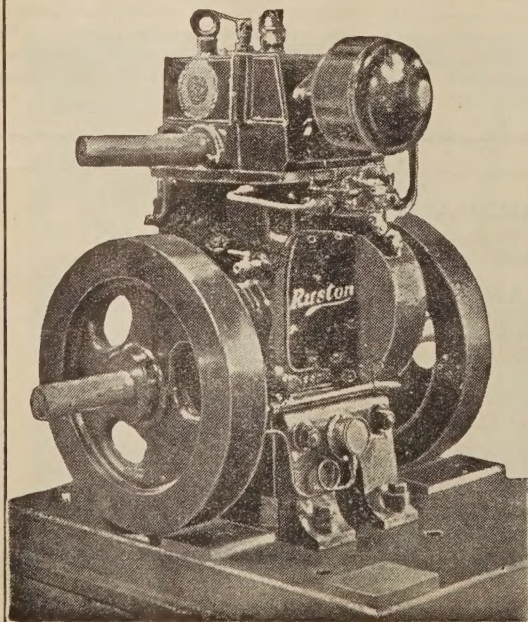
occasionally, acute jaundice is set up as a complication. This is commonly known as "the yellows." It is recognized by the mucous membranes of the eyes, mouth, &c., suddenly becoming intensely yellow. The temperature rises rapidly and fits often occur. It is likely to prove fatal within twelve hours or so.

(3) The Nervous Form.

The virus of distemper has a specific neuro-toxic action—that is, it has a poisonous effect on brain and nerve tissues. In all forms of distemper there is usually some impairment of nervous function. In acute cases there may be intermittent convulsions and fits or some degree of paralysis, usually in the hind legs. Recovery from such paralysis is rarely complete, the animal, as a rule, remaining "weak behind." When convulsions occur the muscles of the head and neck are most effected, the face twitches, the lips are retracted, and the teeth are exposed and chattering, while the head is thrown back and the dog falls down. The seizures last less than a minute, but may occur several times a day, leaving the animal greatly exhausted.

Sometimes meningitis and other brain affections develop. The patient becomes dull and unsteady on his limbs and develops a staring expression, and may

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become blind and paralysed. Chorea, or "twitching," very often develops in the later stages of distemper and becomes a permanent affliction. The muscles of a limb may become affected or, more commonly, the muscles of the jaw may set up the "champing" so commonly seen in dogs. This is usually more noticeable when the animal is tired.

(4) The Cutaneous Form.

This form is not so important as the others. The "secondary invaders" here are *streptococci* and *staphylococci*. The pustules so often present in the early stages of distemper have been mentioned before. However, sometimes more serious skin complications do arise, taking the form of vesicles running down the limbs. These break, forming ulcers which are difficult to heal and which cause great irritation, and the dog frequently bites them severely, causing considerable self-mutilation.

To sum up, any feverish condition in dogs not obviously traceable to some other cause should be suspected of being distemper. As mentioned previously, the dog usually shows a combination of two or more sets of the symptoms given above. In some instances outbreaks of the disease in a very mild form occur, there being little other than a slight cough and some lassitude exhibited.

Treatment.

The mortality among untreated cases will range from 30 per cent. to 50 per cent., and therefore it will be seen that quite a number recover spontaneously—i.e., without treatment. Because of this it is impossible for the layman to assess the value of any particular treatment, and so the door is open wide for all forms of "faith, hope, and quackery."

Most treatments are not only useless and a waste of money, but many of them are actually injurious. Owners of working dogs have been encountered who have professed faith in such as the following: Filling the ears with kerosene, dosing with filings obtained from copper coins, shutting up in a box or barrel for a week, squeezing the anal glands and discharging pus therefrom, and so on. It requires no stretch of the imagination to realize how ridiculous and harmful, as well as cruel, these may be. Other more expensive, pseudo-scientific treatments have been widely patronized. These usually take the form of mysterious "distemper pills" and special inoculations. These, as a rule, are harmless, but most are a waste of money.

Secret of Successful Treatment.

The secret of successful treatment of distemper lies in good nursing and sensible feeding, combined with rational medical treatment of the symptoms exhibited. The animal should be kept warm and dry, but should have fresh air. The eyes and nose should be kept clean and free from discharges by bathing with boracic solution. The nose and the skin below the eyes should then be salved with a suitable ointment, such as zinc or boracic. If the lips, teeth, and mouth are affected they should be sponged also and kept clean.

If the lungs are affected (as they usually are) some sort of a coat should be devised for the animal to wear. In cases where the nose is blocked up or breathing is difficult, medicated inhalations may afford relief. This may be accomplished by putting a few drops of oil of eucalyptus or Friar's Balsam in a kettle of boiling water, but the vessel should not be placed

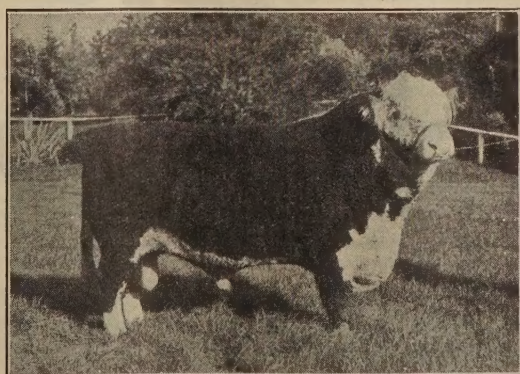
too close to the animal. In an endeavour to reduce the fever an ordinary 5-grain aspirin tablet and $\frac{1}{2}$ grain of quinine may be given twice daily. To assist in allaying the nervous symptoms, 15 grains of potassium bromide may be given daily.

Where diarrhoea is present every effort should be made to check it because of its weakening effect. For this purpose a combination of prepared chalk (20 grains) and chlorodyne (5 drops) should be given three or four times daily. Of greater importance, however, is the diet. This should be light and easily digested, such as raw white of egg mixed with milk, milk puddings, and meat-juices, &c.

Protective Serum.

There is one injection (a hyperimmune protective serum obtainable only through the Wallaceville Veterinary Laboratory) which is of great value providing it is used in the very first phase of the disease—that is, before the "secondary invaders" have become established. Its action is that of counteracting the effects of the "primary virus," thereby rendering it impossible for the "secondary invaders" to become established. Thus, it can be seen why it is so essential that it be given early (within the first day or so of the first rise in temperature).

Unfortunately, in many cases it has not been applied until too late, and then with poor results. In this way a really excellent product is liable to discredit through misuse, for, if it is used as it is intended to be, the results are truly spectacular. From the above facts it becomes evident that its application as a curative measure is somewhat restricted because of (a) the lack of early diagnosis, and (b) the time taken in obtaining the material.



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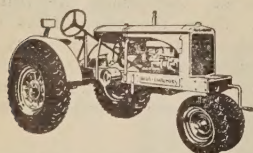
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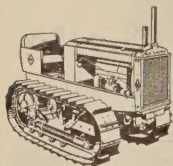
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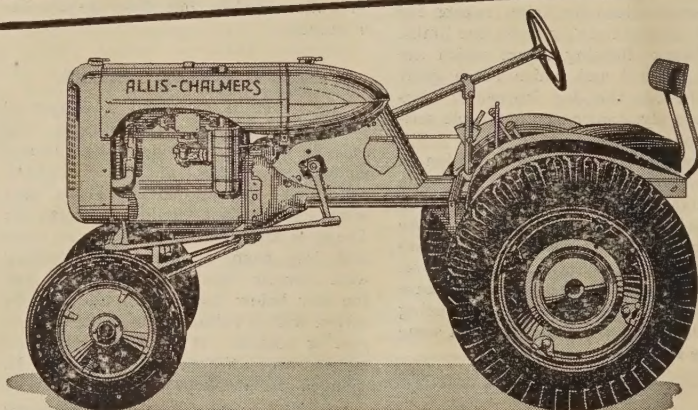
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However, it is extremely valuable for temporarily protecting dogs which are liable to be exposed to infection such as occurs when they are taken to dog trials, shows, &c. Further, it can be used for protecting dogs which are still free from the disease in an establishment where an outbreak is just beginning. Actually, in such a case as the latter mentioned the temporary immunity so conferred by the serum may be turned into a permanent immunity by placing the protected dog in close proximity to the one suffering from the disease.

The explanation of this is that when the serum is administered the dog is being given a "ready-made" immunity and its acquisition has required no effort on his part, but if while he is thus protected he is exposed to the attacks of infection his own tissues are stimulated to produce their own protective material, and the immunity resulting from this effort on his own behalf is permanent.

There are many other so-called curative injections—many of them being made from the germs which act as "secondary invaders"—which have been widely

employed, mostly with very poor results. In most cases where recovery has ensued it is not as the result of the injection, but is because the animal would have recovered in any case. Far better results will be obtained if good nursing and hygienic principles are employed instead of using nostrums of very doubtful value.

Special Preparation.

In addition to the above-mentioned temporary immunity there is another form of inoculation which confers a lasting immunity and which is of very great value. There are only a few (possibly three or four) laboratories in the world capable of preparing the necessary material, as special equipment and faultless technique are essential. The Department's laboratory at Wallaceville has an understanding with one of these rare laboratories in England which enables supplies of their product to be brought into New Zealand. Those interested should endeavour to form "Dog-inoculating Clubs" so that enough material can be brought in fresh at one time to do a fair number of dogs, by which the individual cost will be reduced.

The product mentioned is really excellent and to be most highly recommended. The writer has had considerable and extensive experience of its use in England, where he inoculated large numbers of young foxhounds and other sporting dogs. Under the conditions obtaining it was possible to follow these animals closely in order to assess the benefits derived, and in spite of the fact that the subjects were repeatedly exposed to infection subsequent to inoculation the immunity never failed. These observations were actually carried out on large numbers of dogs, and the incidence of distemper was reduced by immunization from 75 per cent. annually in the puppy crop to nil.

Two Forms of Inoculations.

There are two different forms of this inoculation—one where two injections are given with a fortnight's interval between the two; the other where two injections are given on the same day with only a few hours interval between. The administration has to be performed by a qualified veterinary surgeon or medical practitioner, and, consequently, the latter method is preferred in New Zealand, as only one visit is therefore entailed. However, in spite of the fact that the latter method is excellent, the writer prefers the former.

It is essential that only normal and healthy dogs be inoculated, for if the material be given to dogs suffering from early distemper the results will not be good.

All who have had experience of the disease will know already, and those who have not had this experience will gather from this article, that distemper is a disease which should be prevented. To accomplish this the only effective method is to immunize the dog by the method described. The cost is not excessive, and should be regarded as a sound policy of insurance. Good working dogs are worth more than mere money, and owners will be well advised to consider this suggestion seriously.

Unfortunately, the confidence of many has been shaken by the use of products which are in no way satisfactory. The product recommended is obtainable only through the Department of Agriculture, and private practitioners wishing to obtain a supply of the vaccine may do so by communicating with the Officer-in-Charge, Veterinary Laboratory, Wallaceville. The vaccine should be ordered a short time in advance in order to allow time for delivery of the product in New Zealand.

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(Sgd.) W. SMITH, Kumeu. 7/7/38.

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Rearing Strong Heifer Calves.

Live-stock Division.

CONCERN at the number of feeble and ill-developed heifers in the Te Puke district is expressed by a correspondent, who asks for information on the rearing of calves. He asks:—

- (1) What is the best time to remove the young calf from its mother?
- (2) How long should whole milk be fed to the calf and how much of it?
- (3) How much skim-milk should then be fed to it (according to its age)?
- (4) What sort of meal should be added to the skim-milk, and in what proportion?
- (5) At what age should a heifer have its first calf?

Important Aspect of Dairy Farming.

In reply, the Live-stock Division states:—

The rearing of strong and well-developed heifer calves is a part of the dairy-

farmer's work, which is most important if healthy dairy herds are to be maintained. Too much stress cannot be laid on the necessity for the young calf receiving the colostrum, or first milk, from the mother. The calf should be left with the mother for the first forty-eight to seventy-two hours. In many cases the mother will require to be milked out to relieve the udder. The main objection to this procedure is the difficulty in getting the calf to drink from the bucket after it has suckled the mother.

It is advisable to feed whole milk to the young calf for six weeks to two months at the rate of about 3 quarts of milk per day. This amount may gradually be increased until the calf is receiving from 4 quarts to 6 quarts per day. Some judgment is necessary between a calf of the smaller breeds and a calf of the larger breeds, and also between a small

and a large calf at birth. The golden rule is to leave the calf looking for more. It is better to underfeed than to overfeed.

A good foundation of baby flesh and health in a young calf will enable it to withstand many of the minor digestive troubles. Scours associated with calves reared on skim-milk at this early age and much wastage in dairy herds at a later stage could be avoided by the greater use of whole milk in building up a sound constitution in the young stock.

The Change-over.

The change from whole milk to skim-milk should be brought about gradually. During the change replace 1 pint of whole milk with 1 pint of skim-milk daily until the diet is wholly composed of the latter. Do not increase the quantity of skim-milk daily at first as a

DON'T WAIT

till the cows are sick

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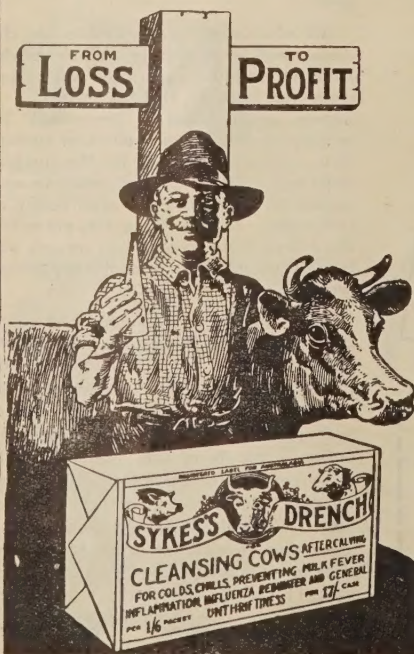
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Mr. John Hale, New Plymouth, N.Z.—

Owner of the famous "Holly Oak" Jerseys, writes that he is a constant user of **Sykes's Drench** at calving time, and attributes the healthy state of his herd to the use of Sykes's. His advice to all farmers who strive to make a success of dairying is to always have Sykes's Remedies in their shed for emergencies.

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DRENCH WITH SYKES'S



substitute for the deficiency of butterfat, but add a cereal or meal substitute to make up for the deficiency.

Excellent results have been obtained from the use of a good-quality meat-meal, liver-meal, or linseed-meal. Crushed oats or a good calf-meal may be used. A small quantity should be used at first when the change-over in milk is being made. About $\frac{1}{4}$ lb. of the cereal meals or half this amount of meat-meal is given at first, and this amount is gradually increased until $1\frac{1}{4}$ lb. of the former and $\frac{1}{4}$ lb. of the latter are being fed daily. The quantity of skim-milk fed daily should never be increased above $1\frac{1}{2}$ gallons to 2 gallons. Add the meal to the milk when the calf has almost finished drinking.

Under our seasonal system of dairying it is the usual practice for dairy heifers to be bred from so that the first calf is born at two years of age. This is the general practice, and as such is the case it is more than ever necessary that throughout the two years the young animals should be fed at all times on a mineral and protein-rich diet so as to allow of proper muscular and skeleton development. The drain of growth and bodily development, as well as breeding at such an early age, unless the animals

are well fed and free from worms and disease, will result in the production of weedy heifers with poor constitution and a lowered resistance to the more common diseases of dairy stock.

The importance of a sound foundation and the laying-down of constitution by breeding and feeding cannot be overstressed, and if more attention were devoted to this aspect the wastage in the adult dairy population would be much reduced.

With the slower-maturing, larger breeds of dairy stock the breeding-period might with advantage be commenced at three years instead of two years of age.



Hydatid Disease.

THE high incidence of hydatid disease in the viscera of slaughtered stock constitutes a serious reflection on stockowners in the apathy which is generally shown regarding any attempt to control this disease. Owing to the publicity given to the life-cycle of this parasite every farmer should know the relationship between the hydatids found in the lungs and livers of sheep and cattle and the tapeworm of the dog.

Until such time as the feeding of raw offal to dogs is discontinued the incidence of this trouble is not likely to become less.

The publicity work accomplished by the Hydatid Research Department of the Otago University in its efforts to lessen the most serious aspect of the problem—hydatid disease in human being produced through infection from dogs harbouring tapeworms—is deserving of the greatest praise, and it is hoped that the legislation which has been passed providing for a year's supply of arecoline hydrobromide (worm medicine) to be issued to each dog-owner at time of registration of the dog will have the effect of materially lessening the incidence of this most serious disease communicable to human beings.

The two things necessary for the farmer to do are (1) dose all dogs on the farm with arecoline hydrobromide four times a year, and (2) stop the feeding of raw offal to dogs. If these conditions were fulfilled by the farming community hydatid disease in human beings in New Zealand would in a short time be eradicated.

—Annual Report of Director of
Live-stock Division.

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Soya Beans in New Zealand.

Question of Economic Value Examined.

M. A. BLACK, Crop Ecologist, Plant Research Bureau, and J. W. WOODCOCK, Crop Experimentalist,
Department of Agriculture.

PERIODICAL waves of enthusiasm for soya beans have swept New Zealand, and will doubtless continue to do so. This is very easy to understand; a crop from which you can make practically anything from salad oil to soft soap, and from glycerine to gum boots, and which is an important food-stuff for a large part of the human race, makes a powerful appeal to the imagination.

Furthermore, the spectacular increase in the acreage grown in the United States from 2,000 acres in 1910 to 5,500,000 acres in 1936 has roused widespread interest in New Zealand. Yet, in spite of recurrent press eulogies, New Zealand farmers do not grow them. Should they be encouraged to do so? To answer this question it is necessary to consider briefly three points:—

(1) For What Purposes They are Grown in Other Countries.

In the East—in Manchuria, Korea, Japan, China—they are grown essentially for human food, because, having a high oil and protein content, they are admirably adapted to balance the deficiencies in these essentials of a staple rice diet. Satisfactory yields, together with very low production costs in the East, make it possible to export large quantities to Europe and America at a price at which manufacturers will use the oil in competition with linseed and other oils for paint, and with tallow, coconut-oil, &c., for soap, and which induces stock-farmers to use the cake in competition with linseed, cotton, and other cakes.

In America and Germany.

In America 75 per cent. of the area is grown for forage. One-sixth of the oil manufactured or imported is used in the manufacture of margarine, and the rest is used in the manufacture of paints, enamels, and soap. The meal is essentially stock feed; all the other highly publicized uses account for a very small fraction of the amount used.

Germany imports large quantities of soya beans (she has given up trying to grow them) primarily for stock-feed, as she exports considerable quantities of

Arguments for and against the cultivation of the soya bean in New Zealand are examined in this article. The conclusion reached is that both from a commercial and agricultural point of view the growing of soya beans is not an economic proposition in this country.

oil. In 1931 she used 1,800,000 tons of cake, of which 49 per cent. was soya cake at 10 per cent. less price than linseed cake.

(2) For What Purposes They Might be Grown in New Zealand.

What, then, are the prospects for the crop in New Zealand? For human food the outlook is not promising, as the value of the beans lies essentially in their content of fat and protein, and New Zealand exports enormous quantities of these in the form of butter, cheese, and meat.

For forage purposes the crop is unattractive, because lucerne will produce fully twice the amount of fodder, and maize still more. Further, grassland farming is highly developed in the Dominion, and under our climatic conditions pastures produce large quantities of high protein feed over a greater part of the year than other countries.

Paint-manufacturers say that soya oil gives a glossier and more elastic finish than linseed oil, and that white paint has less tendency to yellow when made with soya oil than when made with linseed oil. On the other hand, since it has not the same drying-qualities as linseed, special "driers," which cost much more than those used with linseed oil, are required.

Soap-manufacturers say that it is satisfactory for soft soap, but not for hard soap unless hydrogenated, and that it would have to be considerably cheaper than tallow, with which New Zealand is well supplied.

Commercial Aspect.

Commercially, the essential fact seems to be that at no price yet attained have New Zealand manufacturers shown any inclination to use soya oil for paint, soap,



A.K.

Manchou.

Cayuga.

Manitoba
Brown.

or any other purposes. The one exception to this is that bakers use some 27,000 gallons a year for shortening and for greasing baking-tins.

In fact, New Zealand is faced with the problem of producing soya oil at a lower price than it commands on the open market and at a price below that of linseed oil and tallow. For the four years 1932 to 1935 the average price of the beans in England was £6 12s. 2d. per ton, which is approximately 3s. 11d. per bushel. Over the same period wheat in New Zealand was worth 4s. 7d. and maize 4s. 7d. per bushel.

On the available evidence, 20 bushels per acre is probably rather an optimistic estimate of the potential average yield. For the period mentioned the average yield of wheat was 29.7 bushels and of maize 45.8 bushels. This gives a gross return per acre of—

£6 16s. 7d. for wheat :

£10 10s. 8d. for maize :

£3 18s. for soya beans.

(3) *Experience in Growing Them in New Zealand.*

Agronomically, it is reasonably certain that, outside the maize-growing areas, satisfactory yields cannot be relied upon,

although in specially favourable seasons good crops can be grown elsewhere. Temperature is clearly the controlling factor. For example, at Palmerston North in 1935-36 the mean temperature for December, January, and February was 64.07°, and the average yield of the six best varieties was 35.1 bushels; the following year the mean temperature for the same period was 60.6°, and the yield of the same varieties was 9.2 bushels of very low-grade seed. In Manchuria the summer temperatures range from 70° to 75°.

The only part of Canada where soya beans are grown is Southern Ontario. At Ottawa the mean temperature for the equivalent three months is 66.6°, and at Harrow, Ontario, it is 70.3°. At Napier the average is 64.2°, at Tauranga 63.4°, at Auckland 65.3°, at Palmerston North 61.9°, at Blenheim 63.7°, and at Lincoln 60.9°. So that, even in Hawke's Bay and the Bay of Plenty, crop-failure through lack of warmth is by no means out of the question.

Temperatures above Normal.

During the past season temperatures throughout the North Island and in many

parts of the South Island were far above normal, and exceptionally good crops might have been anticipated. Unfortunately, wet weather, combined with high temperature, caused a severe attack of mildew, which completely ruined the crops in many districts.

In the warmest parts of the Dominion mean summer temperatures are dangerously near the lowest limit, and in some years may drop far enough to cause partial or even total crop failure. Grass-grub beetles have, on occasions, completely destroyed experimental areas, and hares and rabbits may also damage the crop very severely.

Field Experiments.

For the past three seasons the Fields Division of the Department of Agriculture and the Agronomy Division of the Plant Research Bureau have collaborated in field trials with soya beans, and altogether fifteen trials were sown. The location of these trials was on the undermentioned farms, and due acknowledgment is made to the farmers who co-operated and to the Instructors in Agriculture under whose supervision the trials were carried out.

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1935-36.—(1) Plant Research Station, Palmerston North; (2) Ruakura Farm, Hamilton.

1936-37.—(3) Plant Research Station, Palmerston North; (4) Ruakura Farm, Hamilton; (5) District High School, Tauranga; (6) Boys' High School, New Plymouth.

1937-38.—(7) Ruakura Farm, Hamilton; (8) District High School, Tauranga; (9) Boys' High School, New Plymouth; (10) District High School, Napier; (11) J. J. Faulkner, Otane, Hawke's Bay; (12) A. Rowbottom, Otane, Hawke's Bay; (13) T. W. Sewell, Patutahi, Poverty Bay; (14) High School, Tolaga Bay, Poverty Bay; (15) C. W. Rushbrook, Matarau, North Auckland.

Description of Plots.

The plots usually consisted of one, two, or three rows of each variety, and they were generally duplicated. In the experiments numbered 11 and 12 above large plots of three varieties occupied an area of about an acre at each centre, and it was intended to obtain some information on the cultivation of soya beans as obtaining under farm conditions. These two areas, however, suffered severely under the flood conditions experienced in early 1938, and could not be harvested. Unfavourable weather conditions were also responsible for the abandonment of experiments Nos. 13, 14, and 15.

In two successive years trials at Tauranga (Nos. 5 and 8) were attacked by brown beetles in the spring, and consequently no yields were obtained from these. The soya-bean crop appears to be particularly attractive to brown beetles, as young maize crops on the same ground were not affected. Consequently, this would be a serious drawback to the cultivation of the soya-bean crops in districts subject to such insect attacks.

Yields Obtained.

In the eight experiments from which yield figures were secured a large number of varieties or strains were included, but only those deemed of most importance are included in the following table:—

Yield of Different Soya-bean Varieties in Bushels per Acre.

Variety.	1935-36.		1936-37.			1937-38.		
	Trial 1.	Trial 2.	Trial 3.	Trial 4.	Trial 6.	Trial 7.	Trial 9.	Trial 10.
Early Yellow ..	45	..	4.2	18.8	15.0	22.3	41.2	16.5
O.A.C. ..	42	35.8	6.5	14.3	18.2	15.6	33.0	19.0
Black Ontario ..	36	..	10.0	18.0	24.2	20.4	32.2	22.0
Manchu (Hudson) ..	36	28.3	8.8	19.1	22.0	27.8	37.7	14.0
„ (Ottawa) ..	34	37.4	7.3	20.8	23.3	16.0	34.1	20.0
Cayuga ..	33	31.1	10.6	18.4	27.5	18.0	32.1	18.0
Mandarin ..	33	32.5	4.3	7.6	15.4	..	40.4	10.0
Black Eyebrow ..	31	..	13.3	20.1	28.6	21.0	20.9	18.0
Manitoba Brown ..	31	16.9	3.7	8.9	24.0	11.1	21.5	5.0
A.K. ..	24	34.6	3.5	16.6	9.9	20.5	23.1	19.5
Henry Ford ..	23	..	2.3	20.9	..	17.6	26.4	18.5
Wisconsin Black ..	18	16.0	4.0	9.1	17.7	5.5	20.9	1.5
Virginia ..	18	..	0.0	13.2	..	27.4	..	..
St. Annes ..	17	..	2.9	15.1	..	9.7	..	..
Loredo ..	13	..	0.0	17.4	..	38.4	..	..

It will be seen from the above table that there is little to choose between certain of the best varieties—namely, Early Yellow, O.A.C., Black Ontario, Manchu, and Cayuga. The average yield of all these was between 23 bushels and 24 bushels per acre for the three seasons.

The question arises whether more extensive introductions might not reveal a variety better suited to our conditions than those already tried, or whether this object might be obtained by breeding and selection. We have tested fifty varieties and selections, and, although

this number is far from exhausting the possibilities, it is perhaps sufficient to justify the suggestion that further work is not warranted unless new evidence is forthcoming that the crop may be of value to the community.

Summary.

(1) Wherever soya beans or soya products are used they are used in place of crops, and crop and animal products that are cheap and plentiful in New Zealand.

(2) Prices are not, and never have been, low enough to attract manufacturers in the Dominion.

(3) Prices are not, and never have been, high enough to make it possible for New Zealand farmers to grow soya beans.

(4) The crop can be grown only in maize-growing districts.

(5) Even in the maize districts the crop is somewhat precarious.

Comparative prices for soya beans and linseed are as follow:—

Present Prices in London, January to April, 1938.

Linseed—	
Indian ..	£14 7s. 6d.
Plate ..	£12 11s. 3d.
Soya beans ..	£7 16s. 3d.
Linseed oil ..	£27 10s. to £29 10s.
Soya oil—	
Oriental bulk	£16 10s. to £18 10s.
Deodorized	£25 10s. to £30.
Linseed cake	£9 15s. to £10 5s.
Soya cake ..	£9 5s. to £9 10s.

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A soya-bean trial at New Plymouth Boys' High School this year.

Warning to Farmers.

Alleged Remedies for Club-root.

A. STUART, Instructor in Agriculture, Invercargill.

PROPRIETARY preparations known respectively as "Pinepesto" and "Pinepestol," which were claimed to prevent club-root in cruciferous crops, met with a ready sale to farmers in Southland and Otago last season. The "Pinepesto" was in the form of a powder to be mixed with the fertilizer and sown through the front box of the ridger at the rate of 12 lb. to 14 lb. per acre, depending on the severity of club-root infection to be expected. The "Pinepestol" was a liquid which, on dilution, was used to treat the seed to be sown. From both the powder and liquid emanated a strong resinous odour reminiscent of the gum from pine-trees.

In co-operation with some seventeen farmers scattered throughout Otago and Southland the Department of Agriculture laid down experiments to determine the merits of these compounds. The accompanying photograph illustrates the result obtained at the Winton Demonstration Farm, and this result was typical of those secured in other districts.

Experiments Described.

This experiment was sown on 24th November, 1937, on land which had a swede crop in 1936, but which was previously in grass for five years. The seed used was the Grandmaster swede, and it was sown at the rate of 14½ oz. per acre.

On the control sections 2½ cwt. of superphosphate was sown through the front box of the ridger, with the seed untreated.



A view of the experiments carried out on club-root.

The next sections were manured as mentioned above, but in this case the seed was treated with "Pinepestol." The seed, although treated three days before, was inclined to be tacky and did not run freely through the seeder.

On the next sections seed treatment was combined with the fertilizer plus "Pinepesto," and 2½ cwt. of a mixture of superphosphate and "Pinepesto," actually supplying 17 lb. of the latter per acre, was applied. It was found that the mixture of "Pinepesto" and superphosphate gave rise to considerable heat.

On the final sections the "Pinepesto" and superphosphate mixture at the same rates as mentioned was applied with untreated seed.

In each section the fertilizer applied through the back box of the ridger—i.e., with the seed—was 3 cwt. per acre of a mixture consisting of equal parts of superphosphate and carbonate of lime, mixed a week before ridging.

Results of Experiment.

Good germination was secured on all blocks, but the treated seed had run

erratically. The blocks were scuffed and thinned in December, but early in February, although fair growth had been maintained, it was noticed that club-root was prevalent in all treatments, playing havoc with the crop and causing a high death-rate.

The photograph, which was taken in June, shows to the right of the white peg four ridges of control, then eight ridges of treated seed, then eight ridges of the combination of "Pinepestol" and "Pinepesto." Actually, there were more surviving bulbs on the control sections than on any of the treated sections, but no bulb was free of club-root.

While the results obtained are extremely disappointing, the lesson to be learnt is that farmers are prepared to spend anything up to £1 per acre if by that means they may obtain security to grow crops on land subject to club-root, or even to secure that second crop which is always so risky.

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[This article is substituted for "Profitable Crops for Pigs" shown in Table of Contents.]

Progressive Farming in Marlborough.

Development of the Tuamarina District.

D. R. WILKIE, Instructor in Agriculture, Blenheim.

THERE can be little doubt that one of the most potent factors for farm improvement in any district is the experience of other farmers. If an analysis were made of the reasons for effecting improvements or branching out into a new type of farming it would be found that, in many cases, this was done because some neighbour on the same type of land was making a success of it. In this way the progressive farmers in each district are doing a great service to the farming community, and it is perhaps unfortunate that their efforts are not more widely known.

It is with the idea of demonstrating what has been done and what problems have been confronted and solved by the practical application of progressive farming methods in the Tuamarina district, Marlborough, that this article is put forward. The fact that the farmers in question, Messrs. Smith Bros., Tuamarina, have, in the past, been confronted with problems that perhaps are being debated on other farms at the moment should help to make their experiences valuable. It is apparent immediately that what applies in one district is not necessarily valuable in another, and it is proposed to cover other districts in Marlborough at a later date in the same manner.

General Trend of Farming Procedure.

The land in question was first taken over about seventy years ago, when it was in the form of a peat bog, into which a large proportion of the water from the Pukaka Creek was received. The area under discussion is one of 250 acres. White-pine stumps and logs were found in the hollows, and matai and totara on the tops. The first work was, of course, drainage, and this was followed by stumping, both of which were extensive works spread over a period of years.

When the land was in reasonable order a cropping programme with wheat and oats was instituted. It was found, however, that conditions were by no means stable enough for successful crop-raising; floods were frequent, and in one season a crop was sown five times, and even then it was not harvested. This could not be tolerated, and through concerted action on the part of the



Fig. 1.—Swamp harrows being used on Messrs. Smith Bros. farm during the breaking-in process. The weed is red shank.

settlers an efficient, large drain for the district and adequate stop-banks were constructed, thus confining the creek, to whose vagaries most of the flooding was due.

In this way it became possible to crop with more success. At this time manuring was practically unheard of, and, in common with the rest of the district, extensive cropping was carried out. It was at this period that Marlborough chaff was renowned throughout the Dominion, and crops of wheat and barley were grown extensively. This phase terminated about 1916, by which time it was apparent that the inherent fertility was being depleted rather too rapidly. In spite of the fact that a small amount of manure was latterly applied, this lowering of fertility was not arrested, and crop yields decreased.

Attempts at Grassing.

It was decided that a change-over from cropping to the growing of leguminous crops and grass with the aid of manure would be one way of getting the land back into good heart. The first attempts at grassing were not particularly successful. Coupled with the fact that the fertility was undoubtedly low, there was the position that persistent and vigorous strains of rye and

other grasses and clovers were not available, and sowings consequently had to be made with the ordinary or false perennial type. These paddocks lasted, on an average, for two years, by which time the sward was "running out" and was fit only for the plough—a position which, incidentally, obtains on many farms to-day.

Later, when improved strains of grasses, particularly rye-grass, made their appearance, a line of certified mother seed was purchased, for it was realized that, although this seed was much dearer than the ordinary strains, the original cost would be returned ten-fold if the repeated two-yearly ploughings could be obviated. Paddocks sown down after peas with mother seed rye, white clover, and red clover, with 2 cwt. of superphosphate and ample liming, still have a good sward eight years after sowing, and with manuring and proper management they are good for many years to come.

Lucerne was also grown to provide grazing and winter feed, such as hay, and at the present time, with the cropping programme cut down, the use of adequate manure and lime, and the utilization of improved strains of grasses and clovers, coupled with the growing of peas and lucerne, the restored fertility is being maintained and increased stock are

carried successfully. The above is a very brief outline of the farming trends on this area from the earliest times to the present day, and some enlargement on certain aspects is necessary.

Pasture Improvement.

It is evident that without the use of the improved strains of grasses and clovers progress made would necessarily have been arrested at the stage when paddocks had to be repeatedly ploughed up. Following the time when the deleterious effects of intensive cropping were becoming apparent, the sowing made was 1 bushel of rye-grass with white and red clover to the acre, as it was contended that a lighter sowing would be advantageous because of the depleted fertility. Later, as the fertility increased under manuring and clover and pea growing, this was increased to $1\frac{1}{2}$ bushels, and good pastures resulted. In a good season the seed was broadcast after peas, both the grass and the peas receiving superphosphate.

The question arose of the palatability of the certified strains of rye-grass. Experience on this farm has shown that, although the strain procured was slightly less palatable than the ordinary type, this was readily offset by having adequate clover in the mixtures, and latterly by including a considerable proportion of cocksfoot. A change in grazing management, which will be referred to later, was also necessary. These factors, together with the manuring, have reduced the palatability factor to zero, and there can be no doubt that more stock are carried than formerly when, because of the defects in grass strain, many of the paddocks were frequently under the plough.

Balanced Ration.

It has also been found that the stock, if properly managed, thrive just as well on certified rye-grass as on the old type, and practically all the rye-grass on the farm is now of the certified strain.



Fig. 2.—Burning logs and rubbish after stumping on Messrs. Smith Bros.' farm.

A recent move has been to cut down the sowing of rye-grass, which was previously $1\frac{1}{2}$ bushels, to 1 bushel, and now 1 bushel of rye-grass with 4 lb. of cocksfoot, a little dogstail, and red and white clovers is being sown. In this way a more balanced ration is expected.

Another point of interest with regard to pastures is the fact that during dry seasons, which are not infrequent in Marlborough, the practice of drilling grass-seed and clover with manure is resorted to. Better strikes and quicker establishment have been obtained in this way when moisture was at a premium. Generally speaking, pasture improvements and an increase in manurial practice go hand in hand, and this has been corroborated on the farm under consideration.

Manurial Practice.

In the latter years of the cropping era the first manure—a special grain mixture—was applied, and the results were outstanding. Following this, the use of manures and lime has gradually increased, until at the present time no crop is sown without manure and paddocks are limed regularly.

In this case the manuring was a gradual evolution. Following the holding of a farm school by the Department of Agriculture in Blenheim in 1923, the top-dressing of pastures was carried out. It was realized before commencing that a 25-per-cent. to 30-per-cent. increase was necessary before becoming apparent to the eye, and, as on this land smaller increases are definitely payable, outstanding results were not expected immediately. Further, it was decided that it would be much better to manure a small area well and consistently rather than to attempt large areas in a half-hearted way.

These two principles are very sound, and have contributed in no small way to success. Two hundredweight of superphosphate were applied to the earlier strains of rye-grass, but this did not arrest to any extent the premature weakening of these stands, and it was not until the manures were tried with the improved types of rye-grass that the true worth of the manure could be gauged.

Persistency in Manuring.

The advisability of persistency in manuring was forcibly demonstrated in one paddock, which was broken up after several years in grass. While in grass it received manure regularly and was sown down in peas with a bag of superphosphate. This crop was followed by turnips, also with manure, and lastly it was sown down to peas again, this time the same application of manure being given. Judging by the history of the paddock one would perhaps be inclined to say that further manure would be unnecessary for a period. This was tested by leaving a drill-width without manure in the last pea crop. The resultant yellowing and dwarfing of the unmanured strip was so pronounced that it was obvious 250 yards away.

As with manure, so with lime. Excellent responses have been procured, and



Fig. 3.—Top-dressing at Mr. Walsh's farm, Fairhall.

it has been found that the application of lime in conjunction with manures is necessary if the best results are to be obtained. An instance of the lasting benefit due to liming might be quoted. The paddock in question was top-dressed with lime in 1930 at the rate of 1 ton to the acre.

Five seasons later, some months after the usual annual amount of superphosphate had been applied, a distinct line was observed down the paddock. This was due to a greatly increased clover growth and to a smaller increase in the growth of the grass. The line followed the calcium carbonate applied five years previously. Lime is now used consistently with superphosphate with excellent results, and particularly is this so with the lucerne crop.

Value of Lucerne.

The lucerne crop was found to be valuable in that it provided grazing and also hay for winter feeding, and is a good standby in dry seasons. It was found that if a good stand was to be obtained several points had to be watched—the main ones being adequate cultivation, superphosphate and lime, and inoculation.

The lucerne is drilled in with peas, which are manured, and the land previously receives $\frac{1}{2}$ ton of lime to the acre. The lucerne also has 1 cwt. of superphosphate and 1 cwt. of lime drilled in with the seed, the latter invariably being inoculated. This last operation has been found to be a very necessary procedure. Good stands have resulted, and they are being maintained by periodic manuring.

Change of Management.

Coincident with the use of manure and improved grasses came the need for different management if full advantage were to be taken of the improvements. It was found that the new type of grass grew rapidly and was most acceptable



Fig. 4.—Lucerne at Messrs. Smith Bros.' farm, showing, on the right, the effect of standing water—a pure grass sward where water has lain.

when young, so that a higher concentration of sheep per acre was needed, and the necessity of a more frequent rotation of sheep became apparent.

A certain amount of subdivision was done, and by the practice described above the best value was obtained from the pasture without harming the sward. Incidentally, the lessened palatability present in rank rye-grass of a good type was obviated. Only in its young stage is the grass offered to stock, and if by any chance growth is too rapid to be coped with the mower is used.

The Position To-day.

By the maintenance of a steadily progressive farming policy a former peat bog has been transformed in a relatively short period into good grazing-land carrying sheep and cattle. A small amount of cropping is done, and areas are laid down in lucerne and clover. It can be seen that this has been accomplished—overlooking for the moment the large amount of hard work involved—by the use of

better types of grasses and clover, ample manuring and liming, and efficient grazing management, all of which factors go hand in hand if success is to be accomplished.

Another point worthy of mention, and for which the writer is particularly grateful, is the fact that full records are kept of all farm operations, a factor which is undoubtedly of great value in deciding, among other things, what is to be sown in the various paddocks.

The courtesy of Messrs. Smith Bros. in supplying the necessary details and in permitting their use is greatly appreciated, and it is hoped that some of their experiences may be useful to other farmers.

♦ ♦ ♦

Agricultural Workers Extension Order (No. 4).

THE Agricultural Workers Extension Order (No. 4) 1938 extends the provisions of Part III of the Agricultural Workers Act, 1936, with the necessary modifications, and with the further modifications set out in the Order to agricultural workers employed in market gardens (including market gardens where soft fruit is produced) situated in the Otago and Southland Industrial District. The Order came into force on the 1st August, 1938, and will continue in operation until the 23rd April, 1939, and thereafter until a further Order is made.

The Order contains substantially the same terms as the Agricultural Workers Extension Order (No. 2) 1938 relating to workers employed in market gardens situated in the Wellington and Nelson Industrial Districts, a summary of which appeared in the June issue of the *Journal of Agriculture* on page 442.

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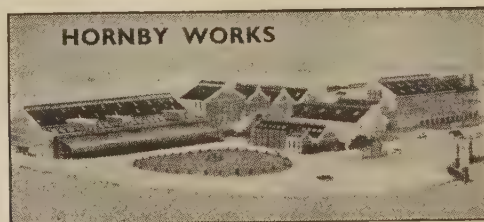
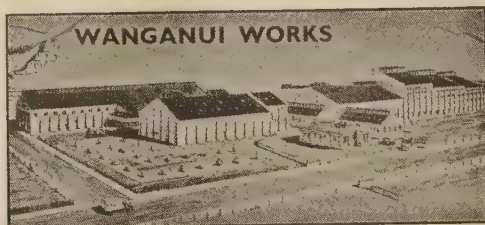
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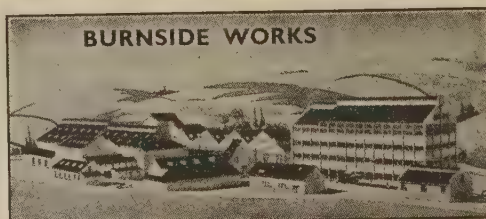
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Detecting Pullularia Infection in Rye-grass Seed Crops.

E. O. C. HYDE, Seed Analyst, Seed-testing Station.

AS is now generally known, the low germination so common in perennial rye-grass seed crops is attributable in most instances to the attacks of *Pullularia*, a fungal parasite of the grass kernel.

A peculiar feature of the disease is the difficulty encountered in detecting its presence in the field. Even where the parasite is present in such abundance that nine seeds out of every ten have been killed it is unlikely that its existence in the crop would be suspected by the grower. The plants may appear perfectly healthy, for it seems that the seeds alone are attacked. Nor will a superficial examination of the seed-heads give any indication of the extent to which the ravages of the disease have laid waste the crop.

The seed may be harvested, and, when machine-dressed, there may be produced a sample with which, by all the old-fashioned criteria of the quality in seeds, it is impossible to find fault. The seed may be of good weight and colour, dry, and free from any mustiness; yet that seed may be almost worthless because of low germination resulting from extensive infection with the fungal parasite.

Examination before Harvesting.

Thus the grower in the past has generally had no notion of the quality of his seed crop until it was harvested and a sample tested for germination. But it is now possible to examine a crop before it is harvested and so learn something of the prospective quality of the seed. If, on such an examination, it is found that, say, 80 per cent. or 90 per cent. of the seed are parasitized the grower can be assured that his crop is not worth cutting.

A farmer who is forewarned in this way may be able to make a tolerable crop of hay, or, if white clover is abundant in the field, he may, in some circumstances, be able to get a crop of white-clover seed by cutting later. At all events, he can avoid the losses involved in harvesting and machine-dressing rye-grass seed that has a very low germinating-capacity.

The procedure in making an examination of the standing crop is simple, but it must be carried out with thoroughness if the results are to be reliable.

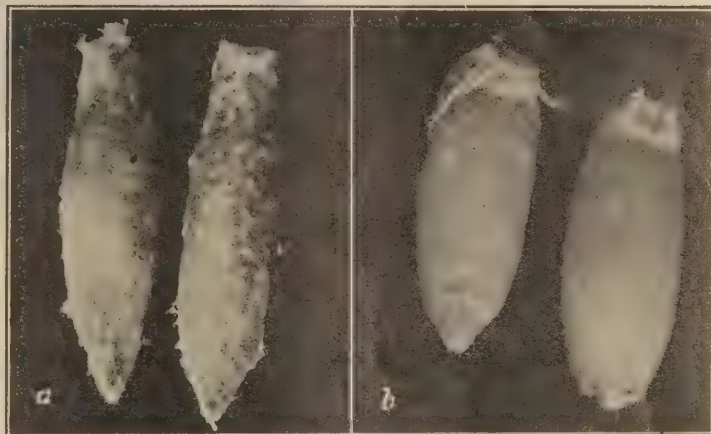


Fig. 1.—(a) Diseased rye-grass kernels. The surface of the kernel is covered with spores in a sticky secretion. (b) Sound rye-grass kernels for comparison with (a).

Examination Described.

The first operation is to collect the seed-heads in the field. A few heads should be taken from each of many scattered points to ensure that a representative sample is obtained, and the sheaf should be packed in such a way that it will not rapidly dry out. If the sheaf is bulky it is satisfactory merely to wrap it closely in several layers of paper. The examination should be carried out as soon as possible after the sample is collected.

In the laboratory the sample is further reduced by taking a few spikelets from scattered positions on each seed-head. Thus, a working sample is obtained, and each seed in the sample is then examined under a dissecting microscope. The glumes are pulled away and the grain examined for the symptoms of infection, and the observations recorded and promptly reported.

When examined in this way the infected seeds can be distinguished by the presence of the sticky fluid carrying the conidiospores. If the seed has become dry the secretion bearing the spores may be solid. It is then of a waxy consistency, clear, or pale pink in colour. Often rain or

dew will have washed away the spores, and infection is then betrayed by the dull, rusty-red colour of the grain and its opaqueness, which makes it appear dark when viewed over a diaphanoscope.

Interpretation of Results.

The interpretation of the results of an examination of a standing seed crop requires the exercise of some judgment. It must be understood that the percentage of infection is based upon the number of seeds in which the parasite has reached an advanced stage of development at the

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time the examination was made, for the incipient stages of infection may pass undetected. A distinction should be made between the smaller and the larger diseased seeds, representing the primary and the secondary infections respectively. The former are very light and are easily removed in the machine-dressing, and it is the latter which reduce the germination of the dressed seed.

It must also be borne in mind that, subsequent to the examination, the disease may spread and the deterioration of the crop be advanced to a further stage. The extent of this further deterioration will, presumably, depend upon the amount of infection at the time of the examination, upon the weather conditions prevailing subsequent to the examination, and upon the time elapsing before the ripening of the seed.

Several examinations of the one area of rye-grass at intervals of seven to ten days yielded the following results, which are given in terms of percentage of parasitized seed: 10, 28, 44, 56. The last figure was obtained at the time the seed was being harvested. The germinating-capacity of the crop was 37 per cent.

Time of Examination.

The later the examination is made the more reliable will the determined rate of

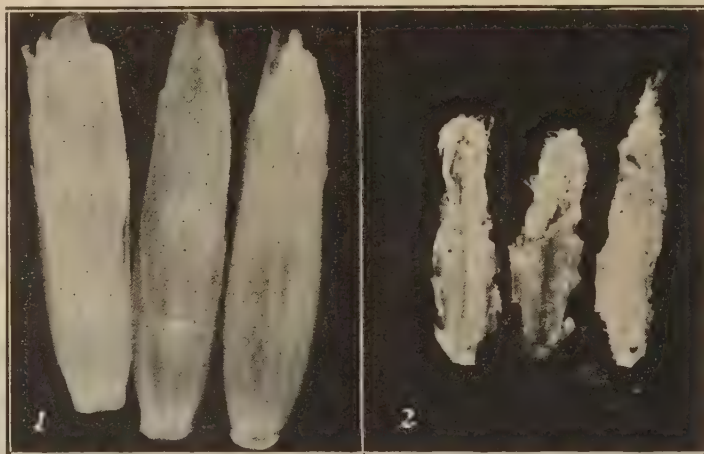


Fig. 2.—(1) Rye-grass "seeds." The kernel in each instance is diseased, but a superficial examination does not betray the fact. (2) The diseased kernels from seeds in (a). Masses of spores are still present on the lower parts of the kernels.

infection be as a basis for estimating the prospective quality of the crop. On the other hand, a farmer who has it in mind to make hay, if the prospects for the seed crop are not favourable, will be anxious to have a report as early as possible. Where possible, it would be well to examine the crop several times at intervals of a week or less.

It will be possible during the coming season to make a limited number of examinations on the above lines at the Official Seed-testing Station, Palmerston North, and any grower of rye-grass seed wishing to have his crop kept under observation is invited to submit samples to the Officer in Charge.

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Farm Control of Feed-flavours.

E. R. MARRYATT, Fields Instructor, Ruakura Farm.

ANY flavour in milk or cream which has been caused by the fodder eaten by the cows may be most readily prevented from recurring, at least to the same degree, by preventing the cows from eating the flavour-producing fodder for some hours—preferably four hours—prior to milking.

Other conditions being equal, the feed-flavour in night's cream is stronger than that in morning's cream. This is because cows usually do not do much grazing, but lie down, between midnight and the morning milking, whereas they do enough grazing to cause feed-flavour between midday and the afternoon milking.

When they are fully-fed during the morning, a spell from grazing for about four hours prior to the afternoon milking reduces feed-flavour without impairing production. This may be made use of by the dairy-farmer in his control of feed-flavours.

Typical Clover Flavour.

The typical feed-flavour which comes from grazing rapidly growing clovery pastures may be reduced by the following farm practices :—

- (1) Grazing the most clovery fields at night and the most grassy fields in the day-time.
- (2) Removing the cows at midday from lush, taint-producing pastures into a field which is comparatively bare, but in which good hay has been fed out.
- (3) Winter-spelling several pastures* to make them grassy for the late spring, when they are rationed-off to the milking-cows.

* See May Journal, 1938, "Cheap Insurance against Feed-flavour, Bloat, and a Late Spring."

Suggested methods of controlling feed-flavour in milk or cream from such sources as clover, turnips, and cress are described in this article. It is emphasized that absolute cleanliness, efficient cooling, and frequent stirring are imperative.

Turnip Flavour.

Turnip flavour may be reduced by—

- (1) Feeding the turnips before they become mature, as shown by the definite pithiness in the bulb.
- (2) Pulling them a day or two days before feeding-out, and allowing them to wilt may be of some value.

- (3) Feeding turnips immediately after milking and never within four hours prior to milking.
- (4) Feeding good hay with the turnips.
- (5) Feeding-out turnips as a soiling crop, and not feeding them off without pulling.

Cress Flavour.

"Cressy" flavour—which is frequently confused with turnip flavour but is caused by twin cress, sometimes known as land cress or hog cress—may be reduced by preventing the cows from eating the cress within four hours before milking. This is not easy, because the cress grows in young pastures, around bull-holes, in gateways and in the race, and around the yards—indeed, on bare ground, anywhere and everywhere.

The only way to prevent the cows from eating it is to kill the cress. Sodium chlorate, used as on ragwort, is worth using on the cress which exists in the

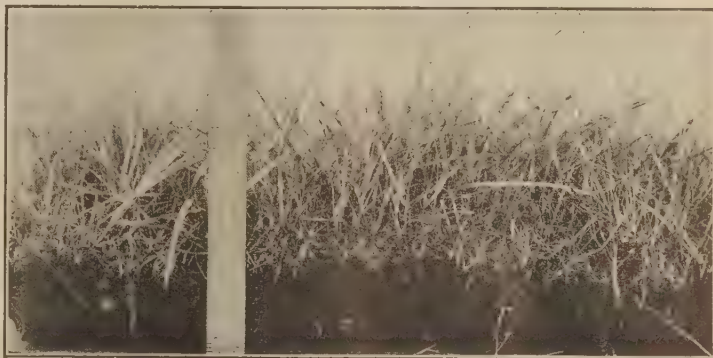


Fig. 1.—A safe pasture from the feed-flavour point of view, and also a very high-producing pasture.

[H. Drake, photo.]

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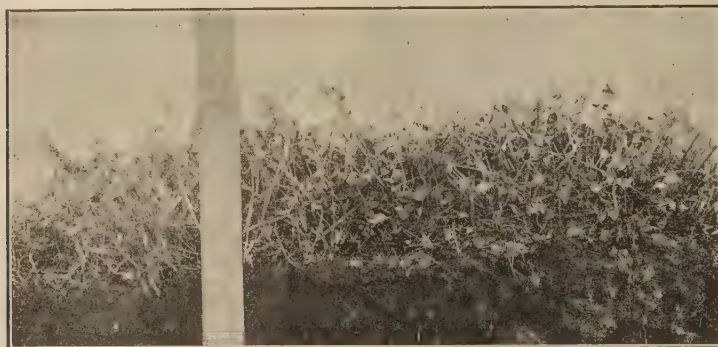


Fig. 2.—Cows should be taken off this kind of growth at midday.

[H. Drake, photo.]

race, in gateways, and around the yards, for even if only one cow gets a mouthful of cress when coming in to be milked the flavour produced in her milk alone may taint the cream. Control of cress in young pastures is more difficult, but Mr. C. Walker, Instructor in Agriculture, Tauranga, makes the following recommendations:—

- (1) Sow only in the early autumn. Employ catch crops to fill in the gap between maize harvesting.
- (2) Sow a simple mixture of perennial rye-grass, Italian rye-grass, white clover, and paspalum. Paspalum might well be sown in the summer, to be followed by sowing the rest of the mixture in February.
- (3) Sow relatively heavy quantities of seed to get rapid coverage of the ground—45 lb. to 50 lb. would not be excessive.
- (4) Manure liberally with superphosphate and blood and bone or superphosphate and nitrate of soda to get more rapid coverage.
- (5) Do not allow the pasture to get out of hand. Cress cannot be smothered by this method.



Fig. 3.—Twin cress (*Coronopus didymus*).

[E. R. Marryatt, photo.]

- (6) Graze cress-infested fields immediately after milkings, and remove stock at least three hours before next milking.

is achieved from pasture-improvement and necessarily goes hand in hand with increased production per acre.

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Pampas-grass as a Fodder.

Value in Hot Summer or Rigorous Winter.

C. R. TAYLOR, Fields Instructor, Whakatane.

SINCE Mr. A. McLean, Waitakaruru, Hauraki Plains, first drew attention some years ago to the practical possibilities in pampas-grass grown specifically as a supplementary stock fodder under the local conditions obtaining in his district, many farmers located in different parts of the eastern Bay of Plenty have experimented with the plant with the view to ascertaining its potentialities under their own local soil and climatic conditions.

Unfortunately, however, only a relatively few of these trials have been carried out with that care and attention to reasonable detail necessary to enable the results obtained to be accepted as a definite criterion of the worth of pampas-growing as an economic farming practice. Consequently, the number of failures have greatly outnumbered the successes, and there is therefore in the minds of many farmers to-day the feeling that not only has pampas-grass so far failed to fulfil the future predicted for it, but that actually there is little purpose to be served by pursuing the matter further.

Potential Economic Practice.

That such an attitude should be adopted, in the circumstances, is unfortunate, for it not only condemns a potential economic practice without giving it that degree of consideration which farmers are usually prepared to give to other phases of their



Fig. 2.—A corner of a pampas-grass plantation established on a farm in the Thornton district, Whakatane. The soil is a mixture of peat and pumice. In spite of a sufficiency of pasture herbage the stock are showing a decided liking for the pampas-grass.

farming activities, but it is also not unlikely that many farmers are actually the poorer for omitting to do so. In this connection one might hazard the suggestion that during the recent outbreak of facial eczema much of the damage caused to dairy herds might have been considerably lessened, if not entirely obviated, had an acre or so of good pampas-grass been available on farms affected.

Again, many farmers will recall the anxious moments experienced during the past hot, dry summer as day succeeded day without the slightest indication of the change in the weather which would have meant so much to their hungry cattle and, to come still nearer to home, their monthly factory cheque. One farmer known to the writer did feed off his pampas-grass plantation at this time, and he is still thankful for the resolution that prompted him to establish and care for just one acre of pampas on a 60-acre farm.

Latent Possibilities.

It might also be mentioned that not a few farmers have expressed their grateful appreciation of the benefits derived from varying acreages of pampas-grass during a rigorous winter season when, for various reasons, the usual winter supply of supplementary fodder had been exhausted before its time. While such experiences cannot, by any means, be called common, they do suggest that in pampas-grass there are certain latent possibilities that can be fully revealed only by a thorough investigation into the matter.

In this, farmers themselves are in a position to do more than any one else, as they alone are in possession of the different soil types associated with New Zealand farming and experience the wide



Fig. 1.—A section of a pampas-grass plantation established three years ago in the Te Teko district, Whakatane. There is just eleven months' growth following the grazing last winter, and the soil is anything but fertile in its natural state.



Fig. 3.—An ungrazed plant three years old in the plantation shown in Fig. 1.



Fig. 4.—A grazed plant in the plantation shown in Fig. 1, and representing eleven months' growth. Note how it has been grazed by stock reaching over the fence.

range in the climatic conditions of the Dominion. Experimental plantations of pampas-grass are certainly satisfactory up to a point, but usually they merely indicate the possibilities incidental to local conditions and thus may be of little assistance to farmers in other localities.

Difficulty of Establishment.

From numerous observations made in this district it appears that the main difficulty connected with the successful growing of pampas-grass is that associated with the establishment of the plant. On this point it is freely admitted that up to the present we have not acquired a great deal of knowledge, but from such knowledge as we have it can be confidently stated that so far as light country is concerned few, if any, permanent results will accrue from the practice adopted in the Hauraki Plains district of planting root-cuttings in areas under grass. In heavier soils of the drained-swamp type, where conditions are more comparable with those of the Hauraki Plains, quite good results have been obtained with either cuttings or seedlings planted in holes prepared in grass paddocks.

On lighter land, however, a large proportion of spring-planted root-cuttings fail to strike before the advent of hot

weather, and of those that do, a major part are subsequently smothered by the fierce competition of extraneous vegetation. Very good results have been secured by a number of farmers where thorough cultivation has preceded planting operations and well-rooted seedlings—the result of nursery-row treatment for some months—have been put out sufficiently early in the spring, and, consequently, this method of establishment can be commended to others as at least being well worthy of a trial where other methods have failed. It is also an advantage, where practicable, to inter-cultivate as much as possible with the object of checking weed-growth and conserving moisture in the top soil.

Planting Before Late Spring.

A double handful of a 50:50 mixture of blood and bone and superphosphate should also be well incorporated with the soil at the bottom of the hole. Planting should not be left until late in the spring, except, perhaps, in the coldest districts. Generally speaking, only well-rooted plants should be used, and so far as the Auckland Province is concerned these could very well be planted out in permanent plantations towards end of July

or early in August. A few frosts will not be nearly as harmful to young establishing plants as the hot, dry conditions that follow late planting. Much of the lack of success in the past has undoubtedly resulted from late planting, and autumn planting has, therefore, much to recommend it in warm localities.

Farmers in this district who have been most successful with their pampas-grass plantations are those who have regarded pampas-grass in the light of a possible valuable perennial crop, and have treated it as such. The unsuccessful plantations are usually to be found in some out-of-the-way corner of the farm with little or no attention given them from the time of planting.

Under such conditions it is, of course, futile to expect results, as pampas-grass, no less than any other plant, is responsive to generous treatment in respect to all those factors that combine to create a desirable environment. Therefore, farmers who are at present contemplating the establishment of a pampas-grass plantation, especially if on light country, would be well advised to give the matter the degree of consideration they would naturally give to the growing of any other valuable crop.

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Malting-barley in New Zealand.

Guide to the Growing of High-class Grain.

J. M. SMITH, Fields Superintendent, Dunedin.

(Continued from September issue.)

WHILE dealing with unevenness in lines of malting-barley it might be as well to show growers just what this means to the maltster. The principle of malting is to change the starch portion of each individual grain into sugars, and to get a high malt extract as much starch as possible must be converted. If the grain to begin with is low in starch and high in other compounds, such as nitrogen, it is obvious that the extract will be low. The practice is to steep the grain for a given period until a certain quantity of water is absorbed and then to spread the grain on the malting-floor to germinate and grow. During this growing-period the conversion takes place, and when the maximum conversion has occurred, the growing is halted by the grain being kiln-dried.

It must be apparent that to get the maximum extract from a line of grain each individual grain must absorb water at a like rate, so that the moisture content when the grain is spread on the floor is the same, and the rate of growth on the floor must be the same with each individual grain. It will be realized then that, in an uneven line of barley, both water-absorption and growth will vary on the floor, resulting in some of the grains

It is essential that barley for malting purposes should be of a uniformly high quality, and growers who are unable to achieve the required standards are penalized in the price they receive for their grain. Harvesting and threshing practices play an important part in the quality of malting barley, and this article points the way to attainment of a product acceptable to brewers and maltsters.

being fully converted and ready for the kiln when others are only half-converted (or less). It is only necessary to state that different barleys require steeping from forty to sixty hours and require from eight to twelve days on the floor for growers to realize how impossible it is efficiently to handle an uneven line. Growers can greatly assist in enabling maltsters to procure more even lines than

in the past, and it is felt that it is merely a lack of appreciation of the maltsters' viewpoint that has led growers to suppose that any old grain can be handled.

Marking of Sacks.

Two factors that cause unevenness have already been dealt with—namely, erratic drilling and the use of impure seed. There are other factors, however, that have a bearing and where the grower can be of assistance. Where two different varieties of barley have been grown they should be kept separate. The sacks should be marked and the buyer notified of such marks when the barley is forwarded. At times a barley paddock is partly on the hill and partly on the flat. If at threshing-time the grower could mark the grain from these different aspects and notify the buyer accordingly, such action would be very helpful to the maltster.

There are other times when part of a paddock is stook threshed, but a change in the weather has necessitated either a delay in the threshing or the stacking of the balance of the paddock. Naturally, the condition of the grain will vary with the two different lots of threshing. One



Fig. 1.—General view of one of the leading malting-barley-growing districts in New Zealand—the Hawea Flat in Central Otago. Extensive areas of barley in stook may be seen.

of the reasons why some buyers insist on stack-threshing is that by stacking and sweating a more even sample of grain results. Moisture content must obviously play an important part in evenness. If the moisture content of the individual grains in a line varies, difficulty will be experienced during the steeping process. Grains with a high-moisture content will be oversteeped and go rotten, while low-moisture-content grains will be insufficiently steeped and will grow but slowly on the floor. Stacking certainly evens up the moisture content of a line.

Some growers may be inclined to adopt the attitude that, as they are not paid anything for invisible evenness, why should they bother about it, but, after all, there is such a thing as good will, and if a better spirit of good will can be built up between grower and buyer many of the grievances (real and imaginary) would disappear.

Careless Threshing.

This brings us to what might be considered a most important point in production—the threshing. In a large number of cases first-grade malting-barley is ruined as a malting-barley by careless threshing.



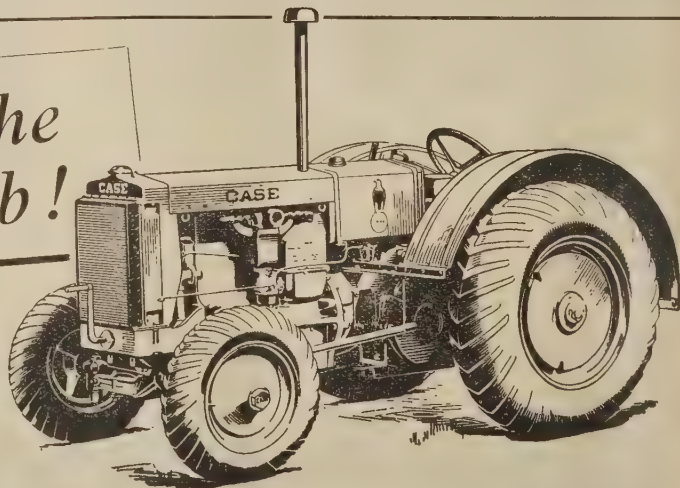
Fig. 2.—Malting barley being stacked prior to threshing. Stack-threshed barley commands a higher price than stook-threshed grain.

Stack and stook threshing have already been briefly mentioned, and, as will be seen by the price table later on, there

is a reduction of 3d. a bushel for all barley threshed out of the stook. Practically all maltsters are agreed that for

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their purpose stack-threshed grain is better than stook-threshed. That some buyers are not so insistent on this as others merely indicates that the former have given up hope of having stack-threshing adopted and are prepared to accept the inevitable. It has even been stated that an insistence on stack-threshing has led to some growers surreptitiously stook-threshing and claiming that the grain was stack threshed.

The advantage of evenness from stack-threshing has already been mentioned, but there are other factors as well. There are barleys which under certain conditions require a prolonged resting period between harvesting and the start of the malting process. Research has yet to show what actually takes place. It is obvious, therefore, that the ripening that takes place in the stack has its advantages and results in what is known as a "kinder" barley, but this condition carries no external appearances, and it is not possible in many cases to state by the appearance of a sample whether it has been stook or stacked threshed.

Injury to Grain.

Complaints are frequently made, with reason, by brewers and maltsters of the

injury done to the grain during the progress of threshing, and it would be as well to outline the malting procedure in order to enable growers to appreciate

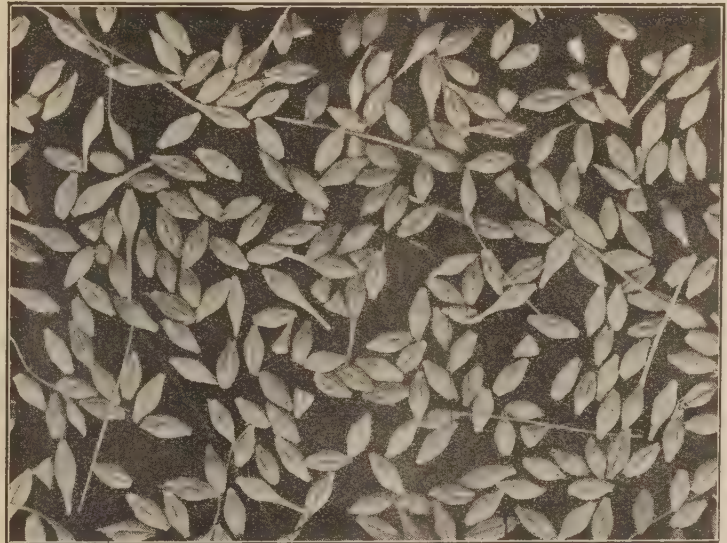


Fig. 3.—9.8 per cent. skinned and broken grains.

how damaged and broken grain interferes with malting quality. As already described, the barley is steeped in water and then grown on the malting-floor, and during this growing the starches are converted into sugars. In order that a grain may grow it must be capable of germination and growth. Where the embryo or germ is damaged or knocked out the grain is dead and will not germinate and the same is true of half-grains (Fig. 3). Not only are these a dead loss to the maltster, but they constitute a danger in that they are liable to contaminate and spoil the whole steep. As a steep may be anything up to two hundred sacks (1,000 bushels) the danger is serious. Cracked or skinned grains with the germ intact are almost as bad, as these grains absorb the water more quickly than the sound grains and may die and rot in the steep, or if they survive will grow more rapidly on the floors as the acrospire (or shoot) will break through the skin at an early stage. On the floors practically all damaged grains, whether they germinate or not, will develop mould, which may seriously impair the quality of the malt. If a maltster through force of circumstance has to handle such lines he is put to the extra cost of disinfecting the floors at frequent intervals, and while this is being carried out his plant is at a standstill. These points should be sufficient to convince growers that for a barley to come into the first grade it should be relatively free from damaged grains.

Reducing the Damage.

How can the percentage of damaged grains be reduced to a minimum? In a

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report to the Government of South Australia a special Committee set up to go into this question summarized their findings as follows :—

- (1) Lack of knowledge in the grower as to what constitutes undesirable skinning.
- (2) Careless harvest work, including omission to adjust threshing-devices or harvesting-machinery to weather and crop conditions.
- (3) Possible mechanical defects from the standpoint of malting-barley in machinery designed essentially for wheat.
- (4) Inadequacy of provision for rapid adjustment of threshing-devices to meet normal changes in field conditions of both weather and crop.
- (5) Relative threshing efficiency from malting-barley standpoint of the American peg-drum and the English bar-thresher.
- (6) The tendency "of repeating" to damage grain in attempts to secure a better-dressed sample.

Adjustments to Machine.

These findings might well be applicable to our own conditions, and it is suggested that growers should consider the following points when threshing barley :—

1. When farmers commence a day's threshing they should at the outset, and repeatedly during the day, carefully examine the grain. If any signs of damage are observed the concave of the drum of the machine should be slightly opened or such adjustment made to the machine so as to leave a little awn on the grain. It may be necessary to make several adjustments during the day, especially when threshing out of the stook. It is advisable also to reduce the

speed of the drum by 100 to 200 revolutions per minute from that used when threshing wheat.

2. A new machine will break the grain more than a machine which has been used for some time and in which the roughness of the beaters has been worn off. On the other hand, when a machine has been much worn, the centre of the drum and concave, having had the most work in consequence of the feeding being necessarily more in the centre than at the ends of the drum, the space between them is greater in the centre than at the two ends, and if they are set to thresh clean in the centre they will be too close at each end, and consequently damage will occur. This fault can be remedied only by putting on new drum beaters and concave ribs. Even after this has been done it is wise to let the machine do several days' threshing with wheat prior to threshing barley. In the case of the American type "tin" mill a number of the peg teeth should be removed from the concave before commencing to thresh barley.

Regularity of Feeding.

3. Attention should be paid to regularity of feeding, particularly in regard to the spread of the sheaves, and the mill should be driven at an even speed.

4. It is not only in the drum of the threshing-machine that damage to the grain occurs, but also in the hummeller through imperfect setting. Here, if the beaters are set too closely and the barley roughly handled, damage will take place.

5. As a further guide in threshing it may be added that on no account should the barley be rushed through the machine, as it is better to be content with a moderate output and a more perfectly threshed sample.

6. Threshing should not be designed to obtain a sample of unduly high bushel weight, as such barley does not command a higher price than grain of moderate weight. According to grading standards, a sample going 52 lb. to the bushel will pass as first grade.

7. It is important that the machine should be thoroughly clean in all parts before commencing threshing.

An Actual Grading.

The importance of good threshing cannot be overstressed. An example of what at times occurs can be instanced in an actual case of Central Otago barley delivered into store this season. This line was submitted for grading, with the result that it was reported on as being below malting standard. The details of the grading figures are as follows (the standards for first-grade barley are given in parentheses) :—

	Per Cent.
Flinty grain	3.0 (10.0)
Foreign matter	0.2 (0.5)
Wild oats	0.0 (0.5)
Skinned and broken grain ..	5.7 (2.0)
Tares and other round seeds ..	0.0 (5.0)
Sprouted grain	0.0 (0.0)
Moisture	12.3 (15.0)
Bushel weight	53 lb. (52 lb.)
Disease	Nil (Trace)

Apart from the broken and skinned grains, due to faulty threshing, the sample is well within the standard for first-grade barley. The faulty threshing has, however, brought the line down to a standard that makes it unfit for malting. Instead of receiving 5s. 1½d. per bushel (stook threshed) for the line, this grower will have to be content with 3s. or 4s. a bushel for it as feed barley. The line comprised 480 bushels, and the loss to the grower will be at least 1s. a bushel (£24), and will probably be double this figure.

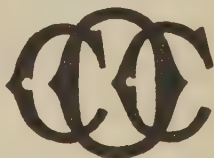
(To be continued.)

♦ ♦ ♦

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Lamb-fattening in North Otago.

T. A. SELLWOOD, Instructor in Agriculture, Oamaru.

BECAUSE of the ravages of the white butterfly on the rape crops in North Otago last season, farmers are seeking other crops which are suitable for lamb-fattening but which are not so susceptible to attack by the white butterfly.

It is doubtful whether there is any other crop which can replace the rape from a fattening aspect. In spite of the fact that it is so susceptible to attack by the white butterfly, it would not be good policy for the farmer to abandon the growing of rape in favour of other crops. The alternative is to sow crops supplementary to rape.

The field in which the rape is to be sown could be put down as follows: Half the field to be sown in partridge peas and the other half in rape. When feeding-off is begun, the netting could be carried across to enclose the rape and peas in a break, each succeeding break to be fenced accordingly. The peas will be reaching maturity by the time the rape is ready for the first feeding. The peas could be sown earlier than the rape, in which case they would be in a more advanced stage of maturity when the first feeding of rape was carried out.

Use of Italian Rye-grass.

The use of certified Italian rye-grass with 2 lb. or 3 lb. of cow-grass would be helpful. This could be spring-sown, and, while it is possible that the lambs would not fatten with the same rapidity as they would with rape, it would materially assist in the topping of the later drafts of lambs.



A general view of good lamb-fattening pastures in the Weston District, North Otago.

[H. Drake, photo.]

At this point it would no doubt be as well to remember that, given reasonable seasonal conditions and growth from now on, North Otago pastures will play a big part in lamb-fattening on the mothers. In other words, the ewes, because of the good grass conditions which should result after the abundance of rain experienced here this season, will be able to maintain a good milk-supply to the lambs, and, as a result, the bulk of the lambs should be

got away as fats off the mothers. If such conditions are maintained the remaining and later drafts can be handled on the rape and peas and the supplementary crop of Italian rye and red clover.

Autumn and Winter Green Feed.

It would be more advantageous to farmers in this district if they would concentrate more on the sowing of

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Italian rye-grass and red clover for autumn and early winter green feed. The sowing of certified Italian rye-grass in February would provide a good supply of green feed, especially in the spring during the lambing-period, as the Italian rye-grass comes away rapidly at this period under normal seasonal conditions. Then, when the first flush of the permanent pasture comes away, the ewes and lambs can go forward to the main pasture for grazing.

The Italian rye-grass could then be closed for a seed crop and the area entered for certification for the production of certified Italian rye-grass, provided the right class of seed were sown. The provision of a plentiful supply of grass through the utilization of certified Italian rye-grass, plus the permanent pastures, should assist the farmer very much in getting good drafts of lambs away from the mothers at this period. Top-dressing practice, naturally, plays an important part in this connection.

Another good practice would be the sowing of 2 lb. or 3 lb. of cow-grass or red clover in the cereal crops in the

spring. It is the usual practice to feed-off the stubble after the cereals have been harvested, and the feeding could be greatly improved by the addition of the red clover. It would help out the fattening process during the "fall" of the year. After the feeding-period the clover could be ploughed in, and it would then serve a dual purpose—that is, it would provide good autumn clover-stubble feed, and, when ploughed in, would act as green manure. If not needed, the crop could be utilized purely as a green-manuring crop. Such a procedure would be highly beneficial.

White-butterfly Pest.

It is to be hoped that the severe winter conditions experienced will have acted as a check on the numbers of the white butterfly, while the fact that the parasite is definitely working throughout the district should further help in its control. It will be as well to remember, however, that we cannot hope to be entirely free from this pest and its attacks on the rape crops.

While the writer clearly realizes that the above suggestions could occupy more space, it is to be hoped that those farmers who wish to proceed along similar lines and who are desirous of obtaining further information will communicate with the local Instructor in Agriculture, who will discuss the matter with individual farmers, if necessary.

♦ ♦ ♦

Toxaemia in Ewes.

Some losses from pregnancy toxæmia (ante-partum paralysis) in ewes took place last year in Hawke's Bay, where owing to dry conditions an acute shortage of feed existed, resulting in a serious loss of condition in the ewes. The disease was also reported as fairly prevalent in North Otago, where a dry season again occasioned feed shortage. The provision of supplementary feed to ensure that no break occurs in the balanced feeding of the ewe flock during the gestation period is the surest way for sheepowners to prevent the occurrence of this disease.

—Annual report of Director of
Live-stock Division.

Jason finds the Golden Fleece



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				Days.	Milk.	Butter-fat.

YEARLY DIVISION.						
Jersey.						
		Yrs. dys	lb.	lb.	lb.	
Junior Two-year-old.						
Fairy Meadows Helen	A. Hazelton, Waihou	1 325	275.5	365	9,800.3	508.74
Mangapiko Nita ..	E. R. Johnson, Mangapiko	2 3	275.8	364	8,698.0	491.14
Pakowhai Rose ..	H. J. Fourneau, Pakowhai	2 34	278.9	251	6,150.8	336.62
Senior Two-year-old.						
Fencourt Chimes ..	R. Wattam, Fencourt	2 252	300.7	365	7,667.1	403.85
Forest Bend Wairiti ..	W. Rayworth, Stanway, Halcombe	2 341	309.6	291	6,314.1	371.05
Three-year-old.						
Meon Operetta ..	E. R. Johnson, Mangapiko	3 9	312.9	364	11,387.6	636.65
Tararua Modesty ..	W. Rayworth, Stanway	3 261	338.1	345	8,483.9	498.90
Alven Tuneful ..	H. Allen, Kihikihi	3 348	346.8	292	7,284.4	466.52
Tirvean Patch's Lassie	Mrs. M. F. Evans, Wera-roa	3 244	336.4	357	8,722.5	455.02
Pinedale Stella ..	H. Lewis, Waharoa	3 354	347.4	330	7,407.8	402.89
Mature.						
Alfalfa French Maid	Mrs. H. Cruller, Kara	6 318	385.0	365	12,425.4	704.88
Velebit Bluebell ..	G. E. Yelchich, Waiuku	5 234	385.0	365	11,996.6	612.27
Maple Farm Queen Maple	J. H. Sherrard, Otatau, Waiuku	5 61	385.0	312	10,543.8	610.76
d'Abrantes Grey Owlet	N. A. G. un n, Rukuhia	5 261	385.0	365	11,139.5	585.98

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.

YEARLY DIVISION—continued.

Friesian.

Senior Two-year-old.		Yrs. dys	lb.	lb.	lb.	
Pine Farm Invincible Ruby	J. W. Leaning, Cambridge	2 237	299.2	287	11,567.7	427.32

Ayrshire.

Three-year-old.						
Greenfields Sunshine	C. E. C. Webb, Foxton Road, R.D., Levin	3 254	337.4	365	13,464.4	542.29

SECOND-CLASS CERTIFICATES.

Jersey.

Senior Two-year-old.						
Velebit Dido ..	G. E. Yelchich, Waiuku	2 297	305.2	365	10,013.6	512.66

305-DAY DIVISION.

Jersey.

Three-year-old.						
Noreen's Fancy ..	A. D. Brough, Mangapiko	3 347	321.1	305	7,825.3	437.03
Four-year-old.						
Miss Lydia ..	E. R. Bull, Manutuke	4 314	354.9	305	8,508.8	472.01

Friesian.

Junior Two-year-old.						
Pareora Ethel Clothilde	L. H. Leslie, Springbank, Rangiora	2 5	251.0	305	12,295.9	450.20

Grain Colour in Dun Oats.

COMMERCIAL samples of Dun oats show great variation in the colour of the grain. Other things being equal, a dark sample is preferred, and commands a higher price. This is because dark-coloured grain is considered to have a higher oil content than grain of a light colour.

As a preliminary step in the production of a pure line of Duns at the Agronomy Division a large number of single plant selections were made. During this work the usual variation in colour was noticed, and, while those with a dark colour were selected, a few pale-coloured samples were also retained.

Three of the darkest and three of the palest were picked out. These were analysed by the Chemistry Department of Lincoln College, who supplied the figures in the table below.

From these figures it will be seen that there was no correlation between grain colour and oil content in the samples examined.

Sample.	Moisture.	Ether Extract.	Ether Extract 100 per Cent. Dry-matter Basis.
	Per Cent.	Per Cent.	Per Cent.
Duns A : Dark ..	12.30	7.33	8.36
" B : " ..	11.76	6.71	7.60
" C : " ..	11.55	7.71	8.72
" D : Light ..	11.32	7.77	8.76
" E : " ..	11.79	7.05	7.99
" F : " ..	11.58	7.17	8.11
			Average, 8.23
			Average, 8.29

—R. Thomson, Agronomist, Plant Research Bureau.

Chemical Control of Ragwort.

Experimental Work at Ruakura.

F. B. THOMPSON, Chemistry Section, Department of Agriculture.

IN the February issue of the *Journal* the results of some experiments on the botanical side of investigations into ragwort control carried out at Ruakura were published by Mr. A. L. Poole.

The present article is intended to indicate how the problems of chemical control of ragwort are being attacked, and to describe experimental work in progress. It is yet too early to make definite recommendations for the guidance of farmers.

An ideal weed-killer, when sprayed or dusted on the foliage of plants, should be absorbed by the leaves and carried through the plant tissues down to the roots, so that finally the whole plant is killed, without sterilizing the adjacent ground and leaving a bare patch in the pasture. In practice it has been found that sodium chlorate falls short of the ideal. At times some of the roots are not killed throughout their whole length and the live parts grow into new plants. Presumably the chlorate does not penetrate sufficiently far down the roots.

Nursery Established.

It was planned to find out, first, exactly what happened when chlorate was applied to ragwort; secondly, the minimum quantity required to kill a plant; and, thirdly, under what conditions the best kills could be obtained. A ragwort nursery which was established at Ruakura early in 1937 provided an abundant source of material for experiments (Fig. 1).

A number of rosette plants, each about 15 in. in diameter, were treated in July with 0.7 grammes (a gramme is $\frac{1}{16}$ oz.) of sodium chlorate. Every few days several plants were lifted for examination. A week after treatment most of the roots were coloured pink for about 3 in. down from the crown. In the following three weeks the colour had spread to about 6 in. and had turned brown. The foliage, crown, and coloured portions of the roots completely rotted away in time. The remaining portion of the roots, which on the average would be about 6 in., remained perfectly healthy, and four months later a number of small rosettes were growing from these incompletely killed roots from one plant.

The result of the very small application of sodium chlorate was little different from that resulting from chipping the

The investigations conducted at Ruakura Experimental Farm into the chemical control of ragwort have not yet been in progress long enough to make definite recommendations for the guidance of farmers. They have shown, however, that sodium chlorate, in spite of its limitations, materially assists the control of ragwort, and is enabling some farmers to replace infested paddocks by productive pasture.

plants, as described by Mr. Poole. The effects are so similar that Fig. 7 (page 88) in his article could equally well illustrate typical new shoot growth from the live portions of a root incompletely killed with sodium chlorate.

Large Quantities Used.

Much larger quantities of sodium chlorate were later used and were also unsuccessful. Subsequently, it was found that because of the loose, cultivated soil

in the nursery there had been an abnormal root development of the ragwort. Many plants had a root spread of over 7 ft., while others had roots to a depth of 22 in. below the surface.

These figures are greatly in excess of the normal size of the root-system of ragwort growing in pasture, and it was considered that any procedure of chlorate treatment designed to kill completely the extensive root system developed under the nursery conditions would be too far removed from practical conditions to be of value. Better root kills were also given by some of the treatments of plants in pasture than in the nursery. Since the beginning of this year, therefore, the emphasis has been placed on field trials. In spite of its disadvantages, however, the ragwort nursery proved very useful for comparing various weed-killers.

Field Experiments.

In locating the field experiments it was desired that the ragwort should be so thick that plots could be marked out where the whole area would require spraying, and that there should be a good sole of pasture to choke out any live ragwort roots remaining after the chlorate treatment. A suitable area was found on a farm near Putaruru, where the ragwort infestation averaged about twenty



Fig. 1.—A portion of the Ruakura ragwort nursery. Each peg marks the site of a treated plant. In the foreground the dead stalks are the only visible signs of some of the treated plants, while others have healthy regrowth. The bushy plants are untreated.

[F. B. Thompson, photo.]

plants per square yard, and at the same time there was plenty of grass and clover in strong competition with the ragwort. The vegetation is illustrated in the accompanying photograph of a typical untreated portion of the area (Fig. 2).

This field-work, which was commenced last February, includes a number of ragwort plots treated with four different chlorate weed-killers applied at various rates per acre. The trials include applications under various weather conditions of chlorate sprayed at strengths from 0.5 per cent. to 20 per cent., and of lime-sodium chlorate dust.

A few of the most promising treatments are being repeated at about two-monthly intervals to determine the comparative success of treatments at different times of the year.

There are now 107 plots on this farm, most of which at present show more than a 95-per-cent. clearance of ragwort. The pasture on the earlier treated plots has now recovered and presents a clean lawn-like appearance. Figure 3 shows a recent view of some of the plots, showing the thick ragwort growth in the untreated alleyways between the plots in striking contrast with the clean plots.



Fig. 2.—The vegetation on the experimental area at Putaruru before treatment, showing the thick ragwort infestation and the grass and clover in strong competition with the ragwort.

[A. C. Poole, photo.]

No Conclusion Yet.

Although there has been a good clearance of ragwort on all the plots except those receiving the smallest quantities

per acre, no attempt is yet made to draw any conclusions from the experiments. The real test of the efficiency of the treatments will not be known till it has been

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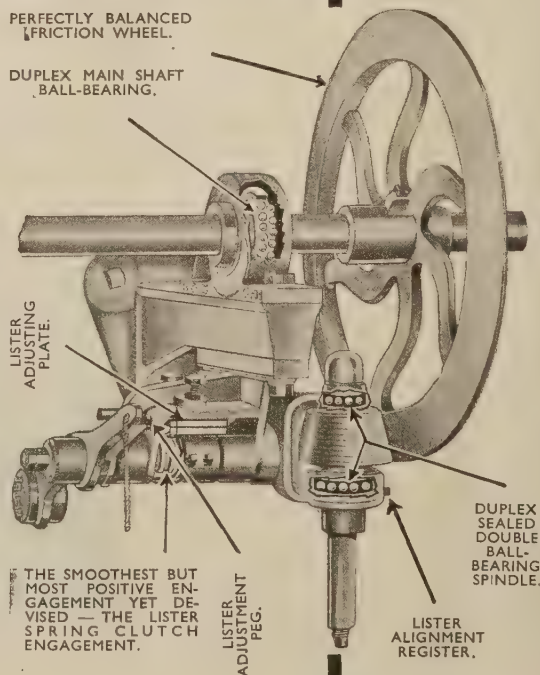




Fig. 3.—Plots four months after treatment with chlorate weed-killers, showing the clean plots in comparison with the bushy growth in the untreated alleyways.

[F. B. Thompson, photo.]

ascertained what degree of regrowth takes place during this spring. In the meantime, the plots have been carefully examined to distinguish between ragwort plants growing from seedlings and those resulting from the regrowths of incompletely killed ragwort roots.

Figure 4 shows a group of five small plants coming up through the pasture. When these were dug up and examined it was obvious that each plant was growing from a small piece of root, presumably a portion from a previous plant which had been incompletely killed by the chlorate. These plants were taken from a plot which, five months previously, had been treated with 75 lb. per acre of sodium chlorate, applied as a dilute spray (Figs. 4 and 5).

In addition to these field experiments at Putaruru, a somewhat similar series is being laid down on the Government farm at Mamaku, using individual plants, rather than a number of plants in a plot.

Most Promising Killers.

Preliminary experiments at Wellington several years ago by Mr. J. A. Bruce, then Inspector of Fertilizers, indicated that out of some sixty-odd chemicals, the most promising were sodium chlorate, sodium dichromate, ammonium thiocyanate, and sodium bisulphite. The effects of these four substances were compared in experiments at Mamaku Farm in July, 1937, and at the Ruakura Nursery in October, 1937. In both cases sodium chlorate was undoubtedly the most efficient, in spite of the fact that it was applied as a 3-per-cent. solution, and the other three materials in 7½ per cent., 10 per cent., and 15 per cent. solutions respectively.

These four compounds were also tried when combined in pairs, and the most

promising combinations from this nursery experiment are receiving further trial at Mamaku Farm.

In addition, the following chemicals were tried out in the Ruakura Nursery: Zinc sulphate, zinc nitrate, copper sulphate, copper nitrate. According to the experiments, each of these chemicals is only about one-tenth as efficient as sodium chlorate. Arsenic was also tried, but it did not give very good kills of the ragwort roots.

The experimental work to date indicates that sodium chlorate and related chlorate weed-killers are giving the best results, and it is felt that there is every justification for concentrating upon these materials. However, if any other more promising weedicide is found, exhaustive experiments will be made with it.



Fig. 4.—Five small ragwort plants growing from incomplete root kills. The head of each of the five matches is placed near the centre of a plant.

[F. B. Thompson, photo.]

Chemistry of Weed-killers.

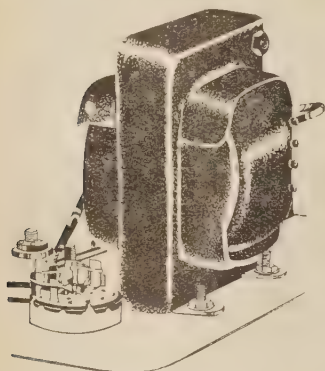
One of the fundamental truths underlying chemistry is that all matter consists of elements or compounds of elements. Any material whatever can be disintegrated into its component elements, but the elements are for most practical purposes indestructible. There are about ninety-two elements, examples being iron, cobalt, chloride, potassium, hydrogen, and oxygen. A given amount of sodium will remain sodium although it may be combined in succession with other elements to form different compounds. For instance, it may unite with chlorine to form sodium chloride (common salt, NaCl) or with chlorine and oxygen to form sodium chlorate (NaClO₃). However, the sodium cannot be destroyed. Similarly, other elements such as mercury or arsenic exist as such indefinitely.

A desirable weed-killer contains a chemical compound which has a poisonous action on plants and which will disintegrate within a reasonable time of application into harmless component parts so that there will be no permanent undesirable effect. Thus in sodium chlorate the portion toxic to plants is the combination of chlorine and oxygen, or what the chemist calls the "chlorate ion" (ClO₃). This breaks down, and the original sodium chlorate finally becomes changed into non-toxic compounds of sodium, chlorine, and oxygen, three common elements which are found in every normal soil.

There are numerous chemicals which would almost certainly be efficient for killing ragwort—for example, compounds of the elements of selenium and mercury.

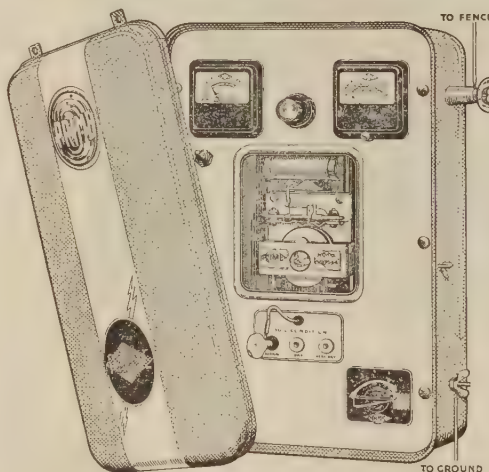
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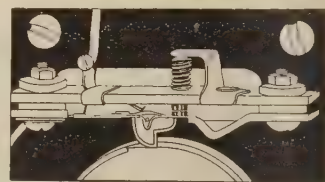
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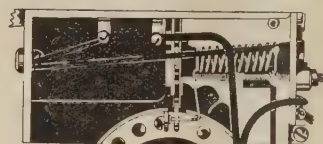
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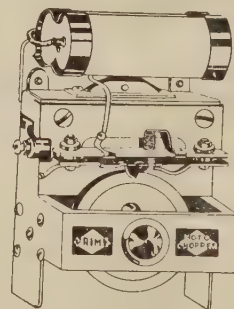
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Such compounds, besides being too expensive, would contain the indestructible poisonous element, selenium or mercury, which would be present in the soil almost indefinitely. The search for suitable weed-killers is limited by cost, by the risk of damage to stock, pasture, and soil, and of poisoning to those handling the material.

"Atlacide" and Sodium Chlorate.

Proprietary weed-killers related to sodium chlorate usually contain sodium or calcium chlorate as the chief component and active principle. One of the best known of these is "Atlacide," which is claimed to be free from inflammability danger. Experiments have been made comparing the effect of sodium chlorate and "Atlacide" on ragwort, and so far no difference has been found. Theoretically, one would expect sodium chlorate to be better because it contains weight for weight more "chlorate ion" than "Atlacide." The nursery or field trials have not yet been sufficiently sensitive to show up differences between the amounts of "chlorate ion" in sodium chlorate and "Atlacide." Therefore, all the preceding remarks about sodium chlorate are equally applicable to "Atlacide."

In the first experiments with sodium chlorate, using very small quantities,

roots of the ragwort plants were not killed. In later experiments in the nursery there was no sign of regrowth

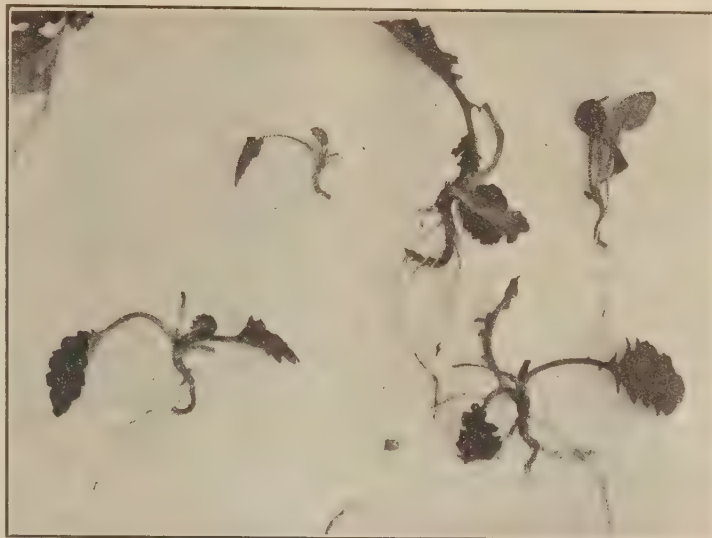


Fig. 5.—The five plants in Fig. 4. Each was growing from an old root, but some of these were broken off when the soil was removed from the roots.

[F. B. Thompson, photo.]

eight months after the application of about 2 grammes of sodium chlorate per plant. Digging indicated the absence of live roots, and a complete root kill was therefore assumed. The results were somewhat erratic, because in another experiment it took up to 14 grammes to produce a root kill. In field trials at Ruakura there is still no sign of regrowth following applications nine months ago of 5 grammes and more per plant. It is therefore concluded that in certain circumstances sodium chlorate does kill all the ragwort roots.

The field experiments now under way at Putaruru and at Mamaku are designed to indicate what these circumstances are—namely, the most susceptible stage of growth, the best time of year and weather conditions, and what quantities of chlorate have to be applied to a plot or to an individual plant to obtain complete root kills. At the present stage it is not advisable to name any quantities, because the experiments have not been laid down sufficiently long.

Present Experimental Work.

The two most feasible methods of obtaining complete root kills are at present being investigated. The first is to get the plant to carry the chlorate down to the root ends. In the glass-house at Ruakura, ragwort plants are being grown in mason jars containing the necessary nutrient solutions. Sodium chlorate and other chemicals are applied to the plants, and every few days the roots are lifted out of the jars and the extent of root injury from the chemical is noted. By using plants growing in this way, external conditions such as

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temperature, humidity, and wind may be controlled. These factors in turn govern the physiological processes such as transpiration, and with the plant growing under control it should be possible to determine what factors are most favourable to translocation of the chemicals to the root ends. Figure 6 shows some of these experimental plants growing in jars.

The second method of ensuring complete root kills is by applying the sodium chlorate so that it will move through the soil and come in contact with the roots, and at the same time not be washed right out of the soil too quickly. Preliminary work has been carried out by spraying small areas of bare soil and then removing the soil in separate 1 in. layers and determining the sodium chlorate in each layer. Different areas were dug at varying intervals of time, so that the effect of rainfall on the chlorate movement would be noted. This work is to be continued in the next few months and the movement in various soil types studied.

Conclusion.

The experimental work has covered most of the lines likely to lead quickly



Fig. 6.—Ragwort and plantain growing in culture solutions. The plants had been in the solutions a month and had already made extensive root growth.

[F. B. Thompson, photo.]

to the discovery of a means of controlling ragwort chemically. However, the results have indicated that there is no such short-cut, and to obtain further definite information it is necessary to continue the detailed laboratory-work and the field trials throughout a complete growing

season. In spite of its limitations, sodium chlorate in practice materially assists the control of ragwort and is enabling some farmers to replace stands of ragwort by productive pasture.

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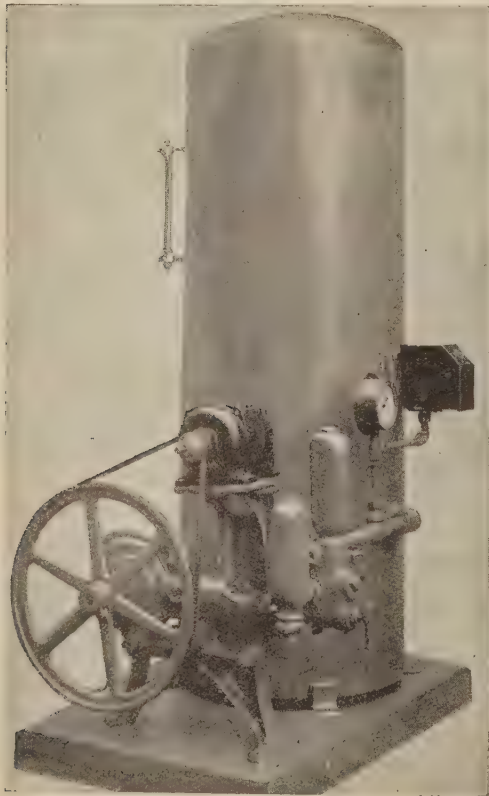
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South Taranaki Farming.

Changed Cropping Practices.

J. E. DAVIES, Instructor in Agriculture, Hawera.

SOUTH Taranaki, which includes the counties of Eltham, Waimate West, Hawera, and Patea, ranks as one of the foremost dairying districts in New Zealand. Temperate climatic conditions, ample and evenly distributed rainfall, rich undulating well-drained soils, and adequate natural water-supplies all contribute to the suitability of the coastal and inland districts towards Mount Egmont for intensive dairying and fat-lamb production.

Since the felling of the heavy bush and the clearing of fern and scrub, which were the natural covering of most of the country, practically all the ploughable land has been cropped and cultivated in the course of renewing the original bush burns and other surface-sown pastures. Much of the country, notably the Waimate Plains and certain coastal areas, has been through a period of fairly intensive cereal cropping. For many years, however, the farm land has been mainly in grass.

Some ten to fifteen years ago the cropping of a portion of the farm for winter feed and the special provision of suitable green fodder crops for summer feed was considered an essential to high production. It was further generally accepted that the farming in South Taranaki was of a fairly high order, and that increased production was likely to be difficult to obtain.

Changed Trend Indicated.

During the past ten years, and more particularly during the past four or five years, a remarkable change has taken place in farm practice. Reliance on crops has given way to the building-up of better pastures, to more efficient pasture management, and to better utilization of grass. Cropping, particularly on dairy-farms, has been considerably reduced, and in very many cases altogether eliminated.

The trend is clearly indicated in the following details of the area devoted to crops and of the area cut for hay and silage in the two seasons 1926-27 and 1936-37 for the four counties referred to:—

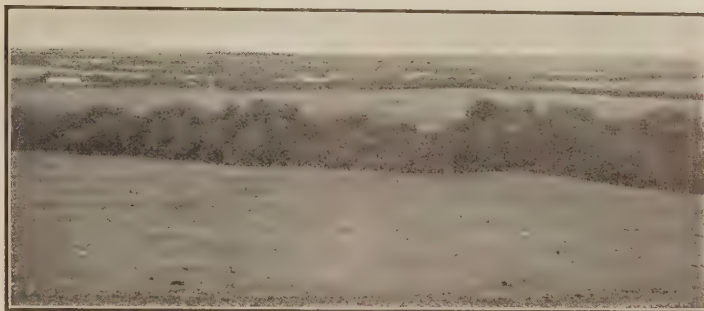


Fig. 1.—Typical South Taranaki coastal land—well sheltered, well watered, and all in grass.



Fig. 2.—An important feature of grass farming—adequate and easily accessible water.

Crop.				Season 1926-27: Area, in Acres.	Season 1936-37: Area, in Acres.	Difference.
Turnips	..	..	..	5,097	2,307	279
Mangels	..	..	..	1,149	470	679
Other fodder crops	..	..	..	5,034	1,602	3,432
				11,280	4,379	6,901
Cut for hay and silage	..	..	..	21,396	32,367	10,971

These figures show that during the past ten years the area devoted to crops has been reduced by more than 50 per cent., and the area cut for hay and silage has been increased by upwards of 50 per cent. While it was an exception ten or



Fig. 3.—Another important feature, good shelter, assists both pastures and stock to give of their best.

more years ago to find a farm with no area in crop, to-day the all-grass farmer or the farm with at the most an acre or so in crop is in the majority, especially where the farm is devoted to dairying.

Effect of Change.

The effect of this change in farm practice on the carrying-capacity of the farms is reflected in the relative live-stock position of ten years ago with that of to-day :—

—	Season 1926-27.	Season 1936-37.	Increase.
Dairy cows	82,807	104,097	21,290
Sheep (including lambs at 1st April)	401,055	503,811	102,756
Pigs	27,148	34,345	7,197
Lambs tailed	196,220	291,997	95,777

The reduction in the area devoted to root and forage crops has not resulted in a decrease in stock, but rather in a remarkable increase of 25 per cent. in each of the groups of dairy cows, sheep, and pigs, and a more remarkable increase of 50 per cent. in the number of lambs tailed. Further, these increases are not, as might be thought, due to an increase in the area occupied or to the area in cultivation. In the four counties the area in cultivation in 1926-27 was stated to be 456,145 acres, and in 1936-37 this had fallen by more than 30,000 acres to 424,781 acres. This fall is due, in the main, to the abandonment of inland areas of steep, beech country which was found too difficult to farm successfully.

Reliance on Better Pastures.

That reliance is placed on better pastures rather than on a greater area of grass is also indicated by the figures for 1926-27 and 1936-37 in respect to land in grass. In 1926-27 there were 424,224 acres in established pasture, and only 442 acres were sown to grass that year; whereas in 1936-37 the area in old pasture had been reduced to 409,131 acres, but 3,606 acres had been sown down that season.

The change in farming practice and methods throughout the area is reflected in the type of sward and particularly in the summer condition of the pastures. Rye-grass is tending to be dominant;

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and the extensive area of cocksfoot-dominant pastures run away to seed, so typical of South Taranaki in the summer some ten years ago, are not now in evidence.

The change has necessitated on the part of the farmers of South Taranaki a closer study of pastures and pasture management, and it is very much to their credit that they have so easily and rapidly adapted themselves to the requirements of the altered farm practice.

Still Room for Extension.

That there is still plenty of room for increased production and yet higher carrying-capacity in this territory as a whole is demonstrated by comparisons of adjoining farms. Farms with a butter-fat production of about 300 lb. per acre are to be found in a group of farms where the average is much less than 200 lb.

The effect of an all-grass farming policy on the condition and health of the live-stock is often questioned. Careful inquiries from those few who have grown no crops for upwards of ten years, but who have developed a carrying-capacity of about a cow to the acre, shows that they, at least, are not concerned with this aspect as yet. They are quite willing to compare their replacement figures with

those of farms where cropping is still a feature and carrying-capacity considerably less.

It is admitted that heavier carrying-capacity, no matter how achieved, is likely to intensify stock troubles. It is, of course, possible that in South Taranaki and other places where land is particularly

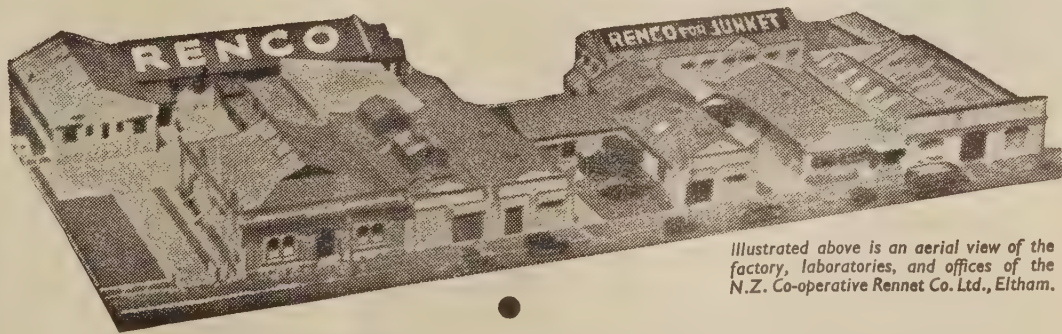
suited to heavy crops a swing-back to an extension of crops as a means of cashing in, as it were, on built-up fertility brought about by some years of an all-grass farming policy may come about with a still further increase in production and net returns.

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Fig. 4.—Yet another aid to high production from grass, closer subdivision—in this case, the electric fence.

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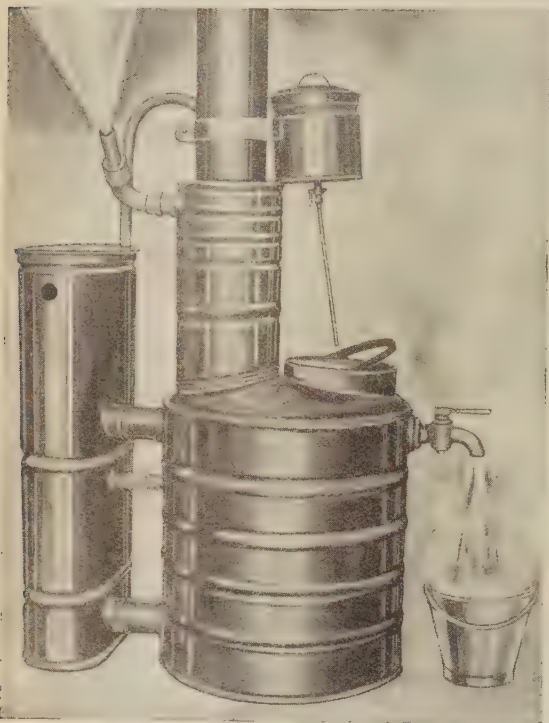
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Benefits from the Pig Census.

M. J. SCOTT, Superintendent of the Pig Industry.

DURING the last twelve months field officers of the Department of Agriculture, both Live-stock and Fields Division, have collected information about pigs from certain farmers every three months. This procedure is known as the pig census. Between five hundred and six hundred farmers keeping approximately 2,500 sows are included in this survey.

Each officer either visits the farm and collects the information or gets the farmer to supply it under the following headings: Pounds of butterfat produced; numbers of pigs born, died, weaned, and bought; pigs sold (weight and numbers) as baconers, porkers, and others; pigs on hand at the end of the quarter (as sows, baconers, porkers, weaned pigs under 100 lb. live-weight); and meals used during the quarter. Once a year information about calves reared, area of crops grown for pigs, condition of equipment, &c., is also asked for. This information is forwarded to Head Office of the Department of Agriculture, Wellington, and is summarized and analysed for publication.

Identity kept Secret.

This year's figures have now just reached this stage. The identity of each farmer is represented by a number, and is known only to the officer who collects the information. For this reason, a farmer need have no fear that this information will be used to his disadvantage or for purposes of checking up on the main business of his farming operations.

The object of the census is twofold. First, it provides a basis of estimation of trends in the industry necessary from the Department's point of view for the purpose of forecasting the quantities of pig-meats for export or other purposes. The census figures deal with only 2½ per cent. to 3 per cent. of the pig population, but this small proportion may be a useful guide for departmental purposes. In the second place, the census provides a basis of instruction.

Benefit from Comparison.

Considerable benefit is obtained by any farmer from a knowledge of what he himself is doing and of what others are doing in similar circumstances. He begins to make comparisons, and to inquire the reasons for differences. This has been the experience of herd-testing all over New Zealand, and of pig-recording

in Waikato and Manawatu. The improvement in methods of pig-keeping and pig-production have resulted from displaying the efforts of the best and tempting those less progressive to copy them. Though criticized, often adversely, from every angle, the lessons learnt from pig-recording, both litter weighing and feeding trials carried out under farm conditions, have been widely copied and become more acceptable each day. The report on recording published last month in the *Journal* is worth perusing for the purpose of assessing the value of this work.

Pig-recording has provided yard-sticks by which the individual may judge his progress—40 lb. weaners; two litters of 300 lb. each per sow yearly; 40 lb., 50 lb.,

100 lb. of pig-meat for every 100 lb. of butterfat; ½ ton to ¾ ton of pig-meat for every sow kept; fourteen pigs sold per sow kept, less than 1 per cent. of condemnations and disease; 80 per cent. of first-quality carcasses; eight cows per sow for mixed pig-meat production; 1 acre of mixed roots for every four sows kept; 1 cwt. of meat used as pig-feed for every cow kept; half a pound of meat-meal per pig daily when no milk is available; £20 of capital expenditure on housing and layout per sow kept; clean grazing and sanitation conveniences, which make pig-keeping less degrading; a policy of combined effort that makes pigs a source of pride and profit worthy of labour spent on them, and capable of



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turning the waste products of the dairy industry into at least 25 per cent. of the gross income on dairy-farms.

Value of Survey.

The census aims at repeating the work of the Recording Clubs on a nation-wide basis, and even though it may take a number of years to reach the point where the information will be wholly dependable, and the inferences drawn from it equally trustworthy, the soundness of finding out by means of the census what the industry is doing and is capable of doing cannot be gainsaid. The value of such a survey is widely recognized, and a similar collection of information about pigs under

actual farm conditions is mooted in England. In the initial stages not all departmental officers nor all farmers may readily appreciate the necessity of attention to detail, and while approximately only half the returns received to date are capable of analysis, the remainder are incomplete in some small matter. This is not to be wondered at, and is a matter that can be remedied.

If there are farmers now supplying the information and doing so unwillingly, the Department would be glad to release them from their present responsibility, as there are sufficient enthusiasts having the interest of the pig business at heart to supply all the information that can be

used. The census is the quickest way of getting down to the real problems of the industry, and will become increasingly valuable as the years go by.

By its means the many and unnecessary small points of difference between methods of feeding and breeding that are so frequently the subject of discussion between farmers and which take up time and thought that could be given more profitably to major considerations should be disposed of, and thus leave time for major considerations. To be more specific, the question of whether 5s. should be spent on farrowing-rails should give place to the question of spending £20 on efficient houses.

Interim Report for Year Ended 31st May, 1938.

THE following averages are in respect of 921 sows on two hundred farms all over New Zealand.

The number of pigs born per sow is 13.4, bought 1.8, sold 11.4, and died 2.9. In a normal state of affairs, presuming that sows last three years on an average, the difference between the numbers bought plus born, and sold plus died, should be about 0.4 pigs per sow. The difference on these two hundred farms is 0.9 per sow, which indicates that either the figures are inaccurate or else that pig numbers are on the increase at the rate of half a pig per sow. The killings for 1938-39 will give the true explanation. The table sets out the production, &c., per sow in the different districts:—

District Council Area.	Number of Sows.	Pigs per Sow.				Pounds Pig-meat produced per Sow.
		Born.	Bought.	Sold.	Died.	
Northlands ..	95	14.4	1.3	11.7	3.0	776
Pukekohe ..	169	13.2	3.9	12.7	3.1	1,190
Waikato ..	37	10.8	0.4	7.1	4.2	713
Bay of Plenty ..	78	16.2	2.1	10.9	4.0	1,109
Taranaki ..	147	12.4	1.3	10.4	2.2	820
Wellington ..	144	12.7	0.2	11.3	2.0	731
Canterbury ..	251	13.8	2.0	11.9	3.2	1,109
New Zealand average	921	13.4	1.8	11.4	2.9	968

Efficient Production.

Readers who are interested can juggle with these figures and note the reputed differences between districts. Pig-meat produced per sow averages 968 lb. It is determined partly by the kind of pigs sold, weaners, porkers or baconers, and partly by the number of pigs purchased. The size of pigs purchased does not influence the result in any way. Sows that produce half a ton of pig-meat are being used efficiently.

Feed listed in the following table under the heading "Other" may be roots, grass, or unharvested crops other than grain. These crops are of low feeding-value by comparison with meals, and in order to make them comparable in feeding-value to gallons of milk or pounds of meal one-tenth of their weight is taken. One hundred and one pounds (see last column, following table, opposite "Northlands") means actually 1,010 lb. of roots or green crops.

The following table deals with the feed-supply:—

District Council Area.	Total.	Feed used to produce 100 lb. of Pig-meat.		
		Skim-milk.	Meal.	Other Feed.
	lb.	Gallons.	lb.	lb.
Northlands ..	908	770	37	101
Pukekohe ..	600	540	45	14
Waikato ..	685	658	27	..
Bay of Plenty	886	639	43	204
Taranaki ..	841	721	42	78
Wellington ..	820	644	61	115
Canterbury ..	554	443	49	62
New Zealand	699	578	46	75

Consumption of Feed.

In general, feed is being used very efficiently when 100 lb. of carcass is produced for 600 lb. of feed. This limit of excellence corresponds with the production of 100 lb. of live-weight for about 450 lb. of feed. Farmers who supplied information from Canterbury and Pukekohe and Waikato are reaching a standard of feed efficiency that approaches perfection. This does not mean that all farmers in these districts use feed perfectly, and following the same line of thought it cannot be argued that the efficiency of feeding in Northlands, Bay of Plenty, Taranaki, and Wellington is generally below par. It is on the average of those farms that have given returns, but there are farmers in all these territories using feed just as efficiently as the best in Canterbury. These results call for caution in their interpretation. They show real differences, but for the present it would be foolish to guess at the explanation of these differences.

A point that may be of special interest to those in districts which grow no grain is the similarity in amount of grain that is used from place to place. These farmers in Canterbury use very little more grain per pig than is used on the average all over New Zealand, and the advantage gained in Canterbury through cheap grain cannot be more than 2s. per 100 lb. of carcass.

It is hoped to make a more detailed study of the information supplied by the census, and further results will be published as they become available.

Agricultural Regulations.

Consignment-notes for Conveyance of Sheep.

A. E. MORRISON, Solicitor, Department of Agriculture.

BY section 2 of the Stock Amendment Act, 1938, every person who conveys sheep, whether by day or by night, on any highway or waterway is now required, except in special cases mentioned later, to hold a consignment-note in a form to be prescribed by regulations under the Act showing particulars of the sheep, the places to and from which, the route by which, and the manner in which they are to be conveyed, and such other particulars as may be prescribed.

The consignment-notes must be prepared in triplicate, and before the sheep are removed all copies must be signed

by the sheepowner or his agent and by the carrier or other person removing the sheep. One copy of the consignment-note should be retained by the sheepowner or consignor, one copy by the carrier or other person removing the sheep, and the third copy must be delivered to and retained by the consignee or person taking delivery of the sheep at their destination. The consignee or person taking delivery of the sheep is required to sign the copy held by the carrier or other person delivering the sheep.

Delivery by Rail.

Where delivery of sheep is made to rail for further consignment by rail to

the consignee at their ultimate destination, two copies only of the consignment-note are required, and the copies must be duly signed as indicated before the sheep are removed. On delivery of the sheep at the railage point a copy of the Railways consignment-note for the sheep must be taken and attached to the copy of the consignment-note held by the carrier or other person removing the sheep in accordance with the instructions of the sheepowner or his agent.

All parties required to sign consignment-notes must keep the copies to be held by them for a period of six months, and may be required to produce them for inspection during that period within twenty-four hours after being required so to do by any Justice, Constable, Inspector under the Stock Act, 1908, the Slaughtering and Inspection Act, 1908, or the Motor-vehicles Act, 1924. The person conveying the sheep may also be required to produce for inspection his copy of the consignment-note on demand by any such official.

Exceptions in Requirements.

No consignment-note is required where sheep are conveyed by the sheepowner or his servant—

- (a) Within the limits of any land occupied by him.
- (b) From land in his occupation to other land in his occupation distant not more than twelve miles.
- (c) To or from a public saleyard distant not more than twelve miles from his homestead.
- (d) To or from any show or exhibition held by any Agricultural and Pastoral Society or other society or association.

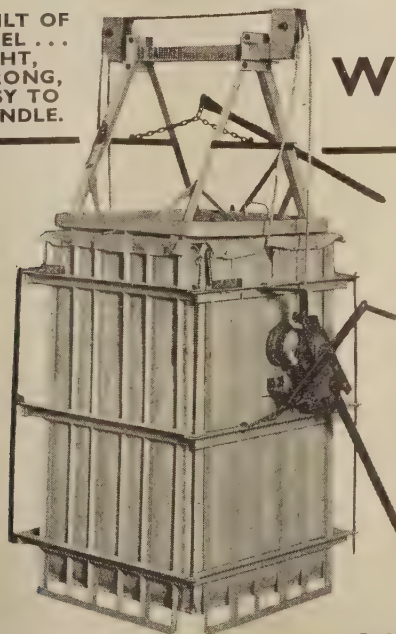
In addition, a consignment-note is not required where sheep are conveyed within boroughs in accordance with borough by-laws or on the Government railways or under a bill of lading or other shipping document.

THE GARDNER

"ONE MAN"

WOOL PRESS

BUILT OF
STEEL ...
LIGHT,
STRONG,
EASY TO
HANDLE.



No top box—height overall,
6ft. 6in.—gives a neat bale.

Rotokino,
South Westland.

"I own a Gardner One-man Wool Press, and find it both efficient and easy to manipulate. I have pressed up to 450 lb. of wool, and could have increased it easily. I am very satisfied with the Gardner."

(Signed) J. C. TIMPERLEY.

£15/15/-

f.o.b. Lyttelton.

North Island Agents:

All Stock and Station Agents, or from Farmers' Co-op. Auctioneers Co., Auckland; Farmers' Co-op. Organization, Hawera; N.Z. Loan and Mercantile, Wellington and Hawke's Bay.

South Island Agents:

All Stock and Station Agents, or from Wright, Stephenson & Co., Ltd., Blenheim; Pyne, Gould, Guinness Ltd., Timaru.

N.Z. Agents:

Cuddon & Stewart Ltd., Christchurch.

Conveyance and Droveing of All Stock.

The present permit system as required by the Stock Amendment Act, 1930, still applies to the conveyance of all stock except sheep by night on highways and waterways and to the droveing of all stock including sheep on highways by night.

Section 3 of the Act makes it an offence to drive or convey on highways or waterways all stock whose general health or condition is such as to render them unfit for travel or transport, and if any such stock are found in any place used for the sale or exhibition of stock the owner is liable to prosecution for a breach of section 3.

By section 4 of the Act the occupiers of public saleyards are required to put in some conspicuous place on a building or board in connection with the saleyards a notice setting forth the requirements of the Stock Act relating to the driving and conveyance of stock.

The Farm-dairy Instruction Regulations 1938.

BY the Farm-dairy Instruction Regulations, 1938, the service of farm-dairy instruction afforded by Farm-dairy Instructors on the staff of the Department of Agriculture to suppliers to dairy factories for the purpose of improving and maintaining the quality of the raw product supplied for the manufacture of dairy-produce is extended to include all suppliers of dairy factories throughout the Dominion. Hitherto, such instruction was afforded to a limited number of suppliers on a voluntary basis by a special arrangement for payment of a portion of the cost of such service made between the Department and owners of dairy factories whose suppliers were given the desired instruction.

The regulations are designed to ensure that not more than three-fifths of the annual cost of farm-dairy instruction will be borne by the dairy industry and the balance by the Government. The portion of the cost to be borne by the industry is, by Regulation 3, to be defrayed by way of levies imposed on owners of dairy factories partly on a butterfat basis and partly on a suppliers' basis. The rate of the butterfat levy is fixed at 0-008d. per pound, and that on the suppliers' basis at 4s. per supplier.

Compiling the Returns.

Monthly returns must be furnished to the Department of the amount of butterfat received for manufacture, and the returns must be accompanied by the levy payable thereon. The levy on the suppliers' basis is payable in one sum

annually, computed on the maximum number of suppliers to the owner of a dairy factory during the months of August, September, and October in any year. In compiling returns of butterfat received for manufacture no account should be taken of butterfat received for manufacture by the owner of a dairy factory from the owner of another dairy factory who has credited his suppliers with such butterfat. A deduction may be made of the total quantity of butterfat credited for any part-monthly testing-period to a supplier whose dairy is, during any part of such part-monthly testing-period, registered under regulations relating to the sale of milk or cream.

In compiling the return for the levy on the suppliers' basis, supplies received from different herds owned by the same supplier must, in certain circumstances, be treated as being supplied by different suppliers. A supplier whose dairy is registered under regulations relating to the sale of milk or cream, or whose supply has been transferred to the owner of another dairy factory, is not required to be taken into account in computing the maximum number of suppliers to the owner of the dairy factory making the return.

Collection of Levy.

Suitable provision is made by Regulation 6 (2) for the collection of the levy on the suppliers' basis from owners of dairy factories who commence operations for the first time after the end of September in any year and by Regulation 9 for owners who permanently cease manufacturing to be liable for payment of levies only up to and including the month in which manufacture ceased.

If the full amount of the levies is not paid at the appropriate time the amount due may be deducted from moneys due or accruing due to owners of dairy factories from the Primary Products Marketing Department. The amount due may also be recovered by Court action.

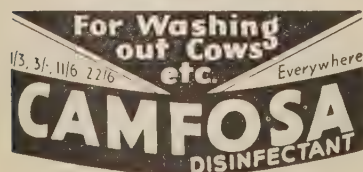
Cost of Instruction.

The annual cost of farm-dairy instruction shall be determined by the Minister of Agriculture, and shall include an allowance for the cost of direct and indirect administrative supervision of field officers actually engaged in the work. Where the total amount of the levies receivable in any financial year exceeds three-fifths of the cost of such instruction the Minister may direct that such reduction shall be made in the rate of the butterfat levy as will be just and equitable, or direct that the surplus for any year shall be accumulated for like adjustment at the end of two or more years, having regard to the amount of the surplus in any year.

Exemption from Liability.

An owner of a dairy factory may be exempted from liability for the levies in the following cases :—

- (a) Where, because of isolation or other cause, it is impracticable to extend farm-dairy instruction to his suppliers :
- (b) Where the Minister is satisfied that the owner has at his own expense provided farm-dairy instruction for his suppliers of a standard comparable with the general standard provided by the Crown :
- (c) Where, at the request of the owner, a special farm-dairy-instruction service is provided for his suppliers and the owner agrees to pay a special charge in lieu of payment of the levies imposed by the regulations.



Make your own Leather
STRONG, PLIABLE, DURABLE

Send six stamps for samples and particulars.

BENJAMIN A. PHELPS, Tanner,
TAURANGA

Reconditioning Tobacco.

CHARLES LOWE, Tobacco Instructor, Motueka.

IT is an acknowledged fact that the correct moisture content of cured tobacco is 12 per cent. In this state it is pliable, and can be packed in bales, cases, or tierces without breaking or damage, and, if free from mould, will keep for many years and improve in value. When all fermentations have ceased the tobacco can be described as "matured tobacco."

A rough-and-ready method for guessing the condition of tobacco is to grasp a handful from the middle and hold it tightly for about ten seconds. On being released it will show the impression of the fingers, but if there is 12 per cent. moisture present the tobacco will come back in the original form in about twenty-five seconds, showing no sign of pressure. Tobacco containing 6 per cent. to 8 per cent. moisture will crackle and break, and tobacco containing 16 per cent. to 20 per cent. moisture will remain bound together and will show the marks of the hand grip for half an hour and, if of the bright cigarette type, will probably be discoloured.

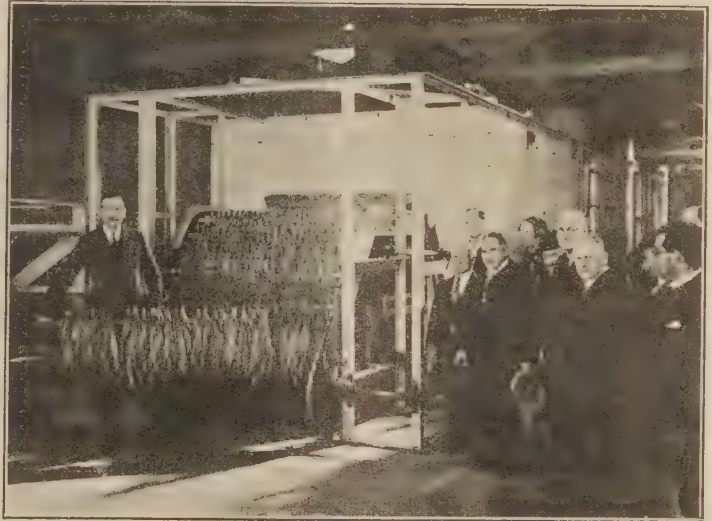


Fig. 1.—The Governor-General, Lord Galway, feeding tobacco into the Proctor machine.

Testing for Moisture.

The moisture-testing of tobacco in the export tobacco packing-works is done with delicate instruments, such as a chemist's scale. One hundred grains of tobacco are weighed and dried out in a suitable oven. When quite dry the tobacco is again weighed and the shortage made up with grain weights. This difference will show the amount of water dried out, and will be the percentage of moisture in the sample under test. Some twenty samples are treated at the same time.

When delivered at the works, farmers' tobacco usually contains from 18 per cent. to 20 per cent. moisture. This amount is desirable, as it enables the graders to spread the leaves open without breakage and allows the hankers to roll the leaf as a tie around the stems to form the hand or hank, which is hung on the drying-stick, half on each side, like a clothes-peg on a line. These sticks are hung on a wheeled truck which carries about 650 lb. and is ready to move up to the reconditioning-machine when required.

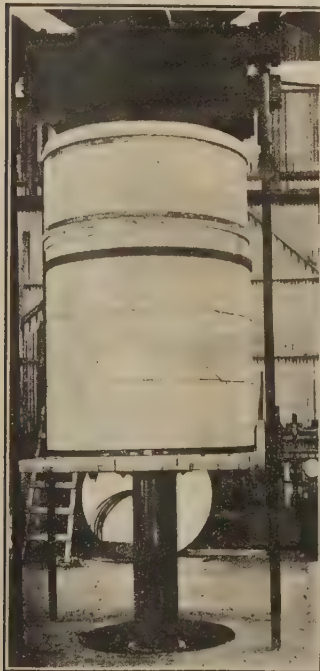


Fig. 2.—Pressing the tobacco into a tierce with a hydraulic press.

1053½ acres
at 30/-
per acre

Situated 25 miles Auckland. All good-quality land. About 400 acres has been grassed, but somewhat overgrown in ti-tree. Balance bush and ti-tree. Numerous paddocks. Well watered. About 400 acres could be made into good dairying country, or would make an excellent sheep-farm. Three-roomed cottage, wool-shed, &c. Metal road. Quite handy to Waitakere station. This is a wonderful opportunity to acquire cheap land handy to Auckland, that must enhance in value. About £800 deposit desired.

Full particulars from Sole Agent: **JNO. GREY.**

AUCKLAND: 1-2-3 Winstone Bldgs., Queen Street.
Phone 43-668. Private 28-216.

HELENSVILLE: Phone 13.

HAMILTON: 175 Victoria Street. Phone 2178.

The most approved method of reconditioning or redrying tobacco is by the Proctor - Schwartz stick and apron machine. The machine at the Government Export Tobacco Bond Store, Motueka, is the smallest made by the manufacturers, and is 70 ft. long, 10 ft. high, and 12 ft. wide.

Machine Described.

The six-foot-long sticks, holding about 8 lb. or 9 lb. of tobacco, are carried through the machine on two endless conveyor chains comprising hooked links 5 in. apart. The chains are propelled forward by a 15 h.p. electric motor which is geared to various speeds, so that the time required to pass the tobacco through can be regulated from thirty to sixty minutes, according to the texture of the tobacco. Fine-textured tobacco of the cigarette type requires less time than heavy-bodied pipe-tobacco. When working at a speed of thirty-five minutes the drying-out process takes twenty minutes, the cooling down five minutes, and the moistening or conditioning ten minutes with live steam. Six 5 ft. fans, with eight blades each, force the hot air, the cold air, and the steam through the closely packed tobacco.



Fig. 3.—The weighbridge and a stack of tierces in the store, with one tierce in the stacker.

The heat is supplied by a 12 h.p. steam boiler circulating steam through four banks or coils of steam-pipes, arranged two on each side of the hot chamber.

Three fans are used to circulate the hot air through the coils and up and down through the tobacco. As hot tobacco will not absorb moisture readily, the

Whatsoever a Man SOWETH

IT is with a man's finances as it is with wheat: Whatsoever a man soweth that shall he also reap. Money sown in A.M.P. policies bears fruit abundantly.

Last month, the widow of a certain suburban shopkeeper drew £1,088, the proceeds of an A.M.P. policy for £500 that her husband had taken out in 1901. Up to the time of his death he had paid to the Society £355 at the rate of £9 12s. 1d. a year. Where is the man in work who couldn't afford sixteen shillings a month for such comfort as this policy has given?

From the moment that policy was taken out the couple knew that, if anything should happen to the husband, the money would be available to pay off the balance owing on the little shop, and what might be owing on the stock. Nothing happened to him for 37 years, so the value of the policy grew with bonuses, coming, at length, to be doubled. Debts had been paid, children had been educated, all had been made secure under the protection of the A.M.P., and now there is £1,088 to make easy the evening of the widow's life.

That was good sowing. What are you doing in this way, reader? Get in touch with the nearest A.M.P. office and ask that an experienced representative be sent to explain how the Society can help you. Do it to-day. Even to-morrow may be too late.



THE LARGEST MUTUAL LIFE OFFICE IN THE EMPIRE.

Established 1849.

(Incorporated in Australia.)

HEAD OFFICE FOR NEW ZEALAND:

Customhouse Quay, Wellington.

W. T. IKIN, Manager.

tobacco has to be cooled down to atmospheric temperature by passing under a fan which draws in fresh air from outside. It then passes into the ordering compartment, which is charged with hot, live steam which condenses on the leaves and is forced up and down again by two fans. The tobacco then is discharged in a finished state at the end of the machine.

Adjustment of Moisture Content.

A series of elaborate valve controls enables the operator to manipulate the process so that the tobacco emerges from the machine containing the desired amount of moisture, which in the present season's pack is 11 per cent. London purchasers object to tobacco containing more than 12 per cent. of moisture, and the London Customs authorities object to tobacco containing less than 10 per cent., so we endeavour to pack the happy medium.

Figure 1 shows the Governor-General, Lord Galway, feeding the Proctor machine with cigarette leaf on the occasion of his visit of inspection on 23rd August. He has kindly permitted this photograph to be used exclusively by the *Journal of Agriculture*.

Packing in Tierces.

As soon as the tobacco is discharged from the Proctor machine it is packed into tierces, which measure 4 ft. in diameter, stand 4 ft. high, and have a tare weight of 145 lb. (Fig. 3). These tierces are placed on flat four-wheeled trucks, which are run over a hydraulic press. The ram-head is level with the floor, and rises up, lifting the truck and tierce of tobacco against the fixed circular plunger-head and pressing the tobacco into half of the tierce. It is then lowered and run on to the weighbridge, the first weighing being recorded on a card attached to the tierce. It is then refilled and a half-sized dummy placed on top and filled. This lot is then weighed before pressing, and the requisite amount of leaf added or taken out to make the content total a net weight of 890 lb.

This lot is then pressed down to about 6 in. below the top edge of the tierce, and is held under pressure for about four minutes (Fig. 2). It is then lowered, and the head is quickly dropped in and the retainer strip of birch wood nailed inside the top edge. The tobacco then expands and lifts the head up against the retainer, when it is firmly nailed in place. A hoop is fitted, and the tierce is stencilled and packed away in storage ready for shipment to London.



TASMAN TOASTED FLAKE

—a winner
right from the start!



There seems to be no limit to the demand for **TASMAN Toasted Flake.**

Sales keep on growing as more and more pipe smokers discover the greater pleasure and economy of **New Zealand Tobacco in Flake Cut Form.**

**1'8
LIGHT
OR
DARK**

The First New Zealand Toasted Flake

Citrus Pests: (4) Black Aphis and Mealy Bugs.

W. COTTIER, Entomologist, Plant Diseases Division, Plant Research Bureau.

(a) The Black Aphis.

THE black aphis, *Aphis tavaresi*, has both winged and wingless forms (Fig. 2). The wingless form is about 2 mm. long, and is black, with the basal portion of the "feelers" or antennæ lighter, these parts usually being a brownish colour. Portions of the legs are also considerably lighter in colour than the black of the body. Characteristic structures in these insects are the cornicles, or so-called "honey-tubes," two of which project at the end of the body, one at each side. Another characteristic structure of aphids is the projecting tail-piece or cauda. All these structures can be seen in Fig. 2.

The flying form of this insect has four wings, the front pair being large and the hind pair small. The head and body and the greater portion of feelers and legs are black, the wings being transparent and colourless. This form also has the black honey-tubes and tail-piece projecting from the rear end. The body is usually about 2 mm. long.

Life-history and Habits.

These aphids are viviparous, or give birth to living young, and in South Africa one has been observed to deposit forty-seven larvæ in twelve days, the lowest number being twenty-two in twenty days. Development to maturity varies from eight to twenty-one days, with an average of 11.8 days. There are therefore many generations a year, and it can be readily understood how a small colony, if unchecked, will rapidly become a large one. In New Zealand small colonies of the black aphis may be found on citrus during the winter, so that the summer form of reproduction goes on all the year round, although, of course, it is greatly slowed up during the dormant season. Winged forms appear in the aphis colonies from time to time, and these fly to neighbouring trees to start new infestations.

This aphis infests the tender young foliage, twigs, and blossoms (Fig. 1). As the spring approaches the small, overwintering colonies increase rapidly with the young growth, and if the aphids are

numerous severe damage to the developing blossom buds may occur. Leaves become twisted and deformed and remain so until they fall. As the growth hardens later in the year, however, the aphis is not able to reproduce so rapidly. The pest is therefore mainly one of the spring

and early summer, although it is often found on young foliage in the autumn.

The aphids derive their nourishment by sucking up sap from the internal tissues of the plant through their slender tube-like mouth parts.

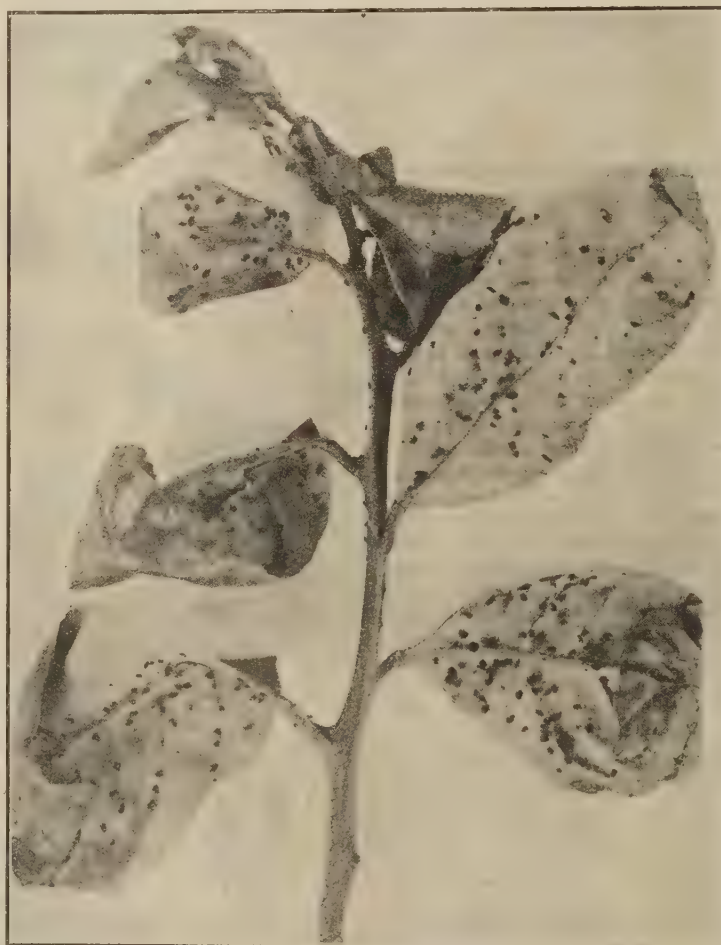


Fig. 1.—Citrus twig and foliage infested by black aphis.

[H. Drake, photo.]

Hosts and Distribution.

This species is recorded from citrus and cotton, and it has been reported from South Africa, Australia, Samoa, Mauritius, Italian Somaliland, Mozambique, Sumatra, and India.

Control.

Control of the black citrus aphid is effected by a spray of nicotine sulphate, 1 part to 800 parts of water, plus soft soap 3 lb. per 100 gallons of spray.

(b) Mealy Bugs.

Mealy-bugs are commonly found. Two species of mealy bugs infect citrus in New Zealand—the long-tailed mealy bug, *Pseudococcus adonidum* L. (*longispinus* Targ.), and the short-tailed mealy bug, *P. maritimus* Ehrh.

As shown in Fig. 3, these insects are white and mealy in appearance. They are oval in outline, more or less flattened, and ornamented with white filaments at the margins of the body. In the case of the long-tailed mealy bug, the filaments at the tail end are much longer than the others, while in the short-tailed mealy bug the tail filaments are much shorter than in the former species, but still longer than the others of the fringe. Both species are provided with antennae, or "feelers," and legs, so that they can readily move about the host plant. The size of these insects varies, but on the average the body of a full-grown insect is about $\frac{1}{8}$ in. long. The young forms are similar in appearance to the adults except in the matter of size.

Life-history and Habits.

The female of the short-tailed mealy bug lays two hundred to three hundred eggs, which hatch in about fourteen days. Eggs are laid in an elongated cottony sac, at one end of which the shrivelling female may often be found. When the egg-sac is completed the female has shrunk to a fraction of its original size. On badly infested plants white egg-sacs are very common. In development from egg to adult there are three moults in the female and four in the male, this period occupying from one to two months. The adult females live for about a month after becoming mature.

Each adult female of the long-tailed mealy bug is viviparous, and produces a large number of living young, there being no egg-laying. Reproduction occupies two or three weeks, about twelve young being born each day. The period from birth to maturity usually requires one to three months, so that there are several generations each year.

In the early part of their lives the young forms show a tendency to migrate to suitable young, succulent tissue. Having

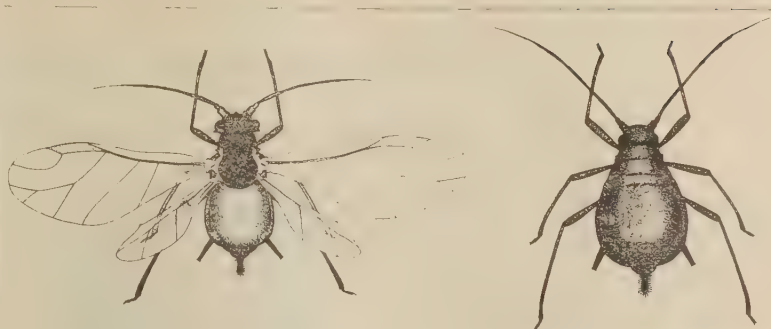


Fig. 2.—The citrus black aphid. Left: The winged form. Right: The wingless form.

[Del.—W. Cottier.]

once found a suitable feeding-ground they will often settle there, although they can move over the host quite freely during the whole of their lives.

Mealy bugs produce large quantities of honey-dew, on which the disfiguring sooty mould *Capnodium citricolum* McAlpine grows. During the winter in New Zealand mealy bugs may be found in the citrus groves in all stages of development.

Hosts and Distribution.

The short-tailed mealy bug infests citrus, pears, apples, quinces, peaches, dahlia bulbs, fuchsia, clematis, rhododendron, grapes, potato tubers, walnut, willow, ivy, passion vine, &c. The long-tailed mealy bug infests citrus, grapes, apple, plum, dahlia, gladiolus, tomato, cactus, rhododendron, passion vine, wisteria, oleander, phormium, cineraria, begonia, &c. Distribution is world-wide.

Control.

For mealy bugs one should use a spray of summer oil 1 part to 80 parts of water, plus nicotine sulphate at 1 part to 800

parts of spray. A good wetting and penetrating agent is very desirable in sprays against mealy bug, and often a good control can be secured by a thorough application of nicotine sulphate 1 part to 600 or 800 parts of water containing a good wetting and penetrating agent.

Control of Pests.

Excepting for red mite, all of the common insect pests have been kept in fair control in the Tauranga District. Following a year of exceptionally light infection, there was a heavy overwintering deposit of red-mite eggs on most trees. The use of winter oil at a dilution of 1-20 to 1-25, as was used in most cases, did not effect a satisfactory control, and in most orchards there was a severe infection of mites very early in the season. In many cases control by the use of summer oil was effected after the foliage had been extensively injured by the mites.



Fig. 3.—Mealy bugs on lemon fruit.

Pedigree-sow Records.

M. J. SCOTT, Superintendent of the Pig Industry.

OF the sixty-eight sows recorded during the quarter ended 31st August, 1938, thirty-seven had litters sufficiently good to be included in one of the grades set out below:—

Grade.	Litter Weight.	
	At Three Weeks.	At Eight Weeks.
	lb.	lb.
1	120	360
2	100	300
3	90	270
4	80	240
5	70	210

In the following list the owner's name and address are given, followed by the herd-book number of the sow and the grade of litter produced:—

Berkshires.

Aoroa Pig Club (P. N. Groom), Aoroa, Dargaville, 12826/3; Barnett, A. L., Leeston, 12558/4; Fieldhouse, H. E., Rongotea, 12514/4, 10811/2; Rockville Pig Club (F. W. Tyree), Rockville, 12805/5; Unwin, S., Stonecroft, Winchester, South Canterbury, 11645/3.

Large Blacks.

Tahuna Pig Club (F. B. Whitechurch), Morrinsville, 1721/5; Whitelock, G. M., Newbury R.D., Palmerston North, 9747/2.

Large Whites.

Canterbury Agricultural College, Lincoln, 4621/3, 4131/4; Johnson, H. E., R.D., Whangarei, 4776/1, 4775/2; Norsewood Pig Club (Mrs. M. E. Jenkins), R.D., Norsewood, 4860/1; Whitelock, G. M., Newbury R.D., Palmerston North, 4546/2.

Tamworths.

Tokomaru Bay Pig Club, 9744/5; Canterbury Agricultural College, Lincoln, 7185/5, 6212/4; Dever, W. A., Te Karaka, Gisborne, 9653/3, 9654/2; Fieldhouse, H. E., Rongotea, 8758/1; Frasertown Pig Club (F. Shaw), P.O. Box 92, Wairoa, 9767/5; Gillett, G. E., and P. C., Sefton, North Canterbury, 7729/2; Golder, A. G., Ninevar, Eketahuna, 9409/1; Hunt, C. A., Glen Oroua, 8921/5, 8926/4;

Kopane Pig Club (E. C. Whitelock), Kopane R.D., Palmerston North, 5626/4; Levin Pig Club (C. L. Roe, Secretary), Levin, 8922/1; McArthur, J. R., Pukekawa, Tuakau, 7897/3; Mauriceville Pig Club (N. Meyers), Mauriceville, 8923/3; Pukekawa Pig Club (J. L. Lindbery), Pukekawa, 10055/5; Ruawai Pig Club (H. Bradley), Ruawai, 5016/3; Shrimpton, A. N., Whakamara, Hawera, 9144/2; Suter, G. A., Waiau Pa, 9797/5, 9798/4; Swanney, A. J., Whatawhata, 8461/2; Whatatutu Pig Club (W. Anderson), Whatatutu, Gisborne, 9037/5; Whitianga Pig Club (J. W. Lauder), Whitianga, 10056/5.

The following table sets out the performance of each breed and the average of all sows recorded during the quarter:—

Breed.	Number of Sows.	Averages					
		Number of Pigs.		Litter Weight.		Weight per Piglet.	
		Born.	Weaned.	Three Weeks.	Eight Weeks.	Three Weeks.	Eight Weeks.
Berkshire	14	8.9	7.0	72.1	219.4	10.3	31.2
Large Black	8	8.9	6.4	70.5	197.4	11.0	30.8
Large White	8	13.2	9.5	102.5	330.2	10.7	34.7
Tamworth	38	9.0	6.9	81.6	245.5	11.8	35.6

The Export Butter-box Pool Regulations 1938.

A. E. MORRISON, Solicitor, Department of Agriculture.

THE Export Butter-box Pool Regulations 1938, which are enacted under the authority of the Agriculture (Emergency Powers) Act, 1934, revoke the former regulations relating to the manufacture and supply of export butter-boxes for the dairy industry, and make fresh regulations in this connection.

The regulations, although rearranged, follow substantially the provisions of the revoked regulations, but contain certain basic alterations in the matter of ascertaining the prices to be paid to boxmakers for boxes supplied to the New Zealand Dairy Board and the pool prices to be

paid by owners of dairy factories for butter-boxes supplied by the Board.

In fixing the prices to be paid by dairy factories for butter-boxes supplied under the regulations, provision has been made for taking into account the various cost factors involved in the packing of butter and the closing of the particular type of butter-box used. The pool prices for the various types of butter-boxes for the past manufacturing season have been adjusted so that the packed and closed cost of each type of box is the same.

In the revoked regulations provision was made for the pool prices for butter-

boxes to be ex box-factory, but in the case of supplies to certain dairy companies it was found unreasonable to charge full freight from the box-factory. Consequently, by an amendment incorporated in the regulations, the Board is now given power to fix another point as the place from which dairy companies will be required to pay freight on butter-boxes so purchased.

The regulations also give the Board power to arrange for the storage of butter-boxes purchased by it at such places and on such conditions as it thinks fit.

❖ ❖ ❖

Obituary.

Mr. J. A. Campbell, Director, Horticulture Division.

WITH the death of Mr. James Angus Campbell, Director of the Horticulture Division of the Department of Agriculture, on 24th September, New Zealand has lost one of its most prominent horticulturists. Mr. Campbell collapsed while attending a Masonic Lodge gathering at Island Bay, Wellington. He was sixty-four years of age.

Mr. Campbell was a native of Victoria, Australia. He arrived in New Zealand forty-one years ago and became a landscape gardener and horticulturist, and among his many achievements was the laying out of the grounds of the Christchurch Exhibition and the supervision of that work, which was under the control of the Department of Agriculture.

Mr. T. W. Kirk, who was Director of the Horticulture Division at that time, was so impressed with Mr. Campbell's work that he persuaded him to join the Department in 1908. Later he was appointed Orchard Instructor at Hamilton and then at Hastings. In 1915 he was appointed Assistant-Director of the Horticulture Division. Mr. Campbell in 1919 paid an extended visit to the United States of America in the interests of his Department. Shortly after his return Mr. Kirk retired, and Mr. Campbell was then appointed Director of the Horticulture Division.

Work for Fruit Trade.

During Mr. Campbell's term of office the fruit-export trade of the Dominion has been created and has grown to main importance. The success of this industry is the result in no small measure of Mr. Campbell's kindly interest, wise counsel,



The late Mr. J. A. Campbell.

and untiring service. His qualities as a leader have been of great value to the fruitgrowers and honey-producers of the Dominion. Himself so greatly interested in the land, he had a complete understanding of the producers' problems, and his advice was much sought after and highly valued in Government circles.

In association with the late Mr. G. A. Green, Mr. Campbell assisted in the organization of the New Zealand Institute of Horticulture, and it was largely his zeal in this work that has enabled the institute to stimulate interest in and raise the status of New Zealand horticulture.

"Service Before Self."

Mr. Campbell's enthusiasm and organizing ability were as keen in recreation as

in business, and this gained him many friends. Always a keen bowler, he had a long and pleasant association with the Island Bay Bowling Club and had served the club as president. Throughout his business and private life his motto was always "Service before self"; it was his appreciation of this that led him to join the Wellington Rotary Club, where he enjoyed companionship with kindred spirits.

A foundation member and a past master of the Island Bay Lodge of Freemasons, Mr. Campbell always regarded it as his favourite lodge. He was a man of plain tastes, unswerving loyalty, and genial disposition. A fluent speaker, he had a great faculty for gathering up possibly conflicting arguments and making some proposal satisfactory to all parties. His death is a tremendous loss to the orcharding industry.

Mr. Campbell is survived by his wife, two daughters, Mrs. D. M. Grover and Mrs. W. A. Simpson, both of Wellington, and one son, Roderick. There is one grandson.

Largely-attended Funeral.

The funeral of the late Mr. Campbell took place on 27th September at the Karori Cemetery, and was very largely attended. Floral tributes were received from Great Britain and from all parts of the Dominion.

The service was conducted by the Rev. Brian Kilroy, of St. Andrew's Presbyterian Church, and the Masonic portion of the ceremony by the Master of the Island Bay Lodge, Mr. W. F. C. Vine.

Mr. K. W. Gorringe.

A FORMER Supervisor of the Pig Industry for the Department of Agriculture, Mr. Kirke Wood Gorringe, died recently at his home, 66 Kelburn Parade, Wellington.

Mr. Gorringe was born in 1871 at Bexley, Kent, England. He came to New Zealand in 1891. For a number of years he was engaged in farming in Taranaki. Later he set up the first model pig-farm at Te Rapā, Hamilton.

In 1920 Mr. Gorringe joined the Department of Agriculture as Supervisor of the Pig Industry. He lectured throughout both the North and South Islands. Mr. Gorringe was responsible for improving the standard of pig-keeping in the Dominion and played a large part in developing the export industry. He retired at the end of last year.

As a young man in Taranaki he took a keen interest in amateur drama. For the last seven or eight years he was a

very enthusiastic member of the Kelburn Bowling Club, and represented the club in local tournaments.

He is survived by his widow, one brother, Mr. A. R. Gorringe (New Plymouth), and two sisters, Mrs. Florence Crane (Auckland) and Mrs. Mary Mahlstedt (Melbourne).

The funeral service was conducted at St. Peter's Anglican Church, Wellington, by the Rev. D. C. Bates. The service at the Wellington Crematorium was also conducted by Mr. Bates.

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Ensilage-making Equipment.



Fig. 1.—A general view of a two-way tipping-bucket made out of half an oil-drum and used to hoist earth to the top of the ensilage stack.



Fig. 2.—A bottom view of same drum, showing the loop in the strap.

ALTHOUGH it will be some months before the ensilage-making season commences it is a wise practice to overhaul all gear and make up deficiencies in equipment in order to ensure that unnecessary delays do not occur. A weakness often found is that some makeshift and inefficient container is utilized to hoist the earth which is used to weigh down the stack.

Last season the manager of the Northern Wairoa Experimental and Demonstration Farm at Dargaville designed a very efficient two-way tipping-bucket. A 40-gallon oil-drum cut into two halves

made two of these containers. With the two buckets in use, one is filled while the other is being hoisted up and emptied on to the stack.

Details of construction are shown in the accompanying illustrations. The top band to strengthen the edge was made out of an old buggy-wheel tire, while the strap down both sides and across the bottom is of 2 in. by $\frac{1}{4}$ in. metal. As shown in the second illustration, a loop was worked into the centre of the bottom strap. When a bucket of earth is hoisted it is dropped on to its side on the stack. The S hook of the lift is removed and placed

in the lower loop, and the horse then lifts the bucket clear as the earth is emptied out.

The cost of providing the two buckets amounted to £3 7s. 6d.—10s. for the drum and £2 17s. 6d. for the straps. The handles were made and the assembling performed by the local blacksmith. These two containers should last for a number of years, and when the drum portions become unserviceable the handles and straps can be fitted with new half-drums.

—E. H. Arnold, Instructor in Agriculture, Dargaville.

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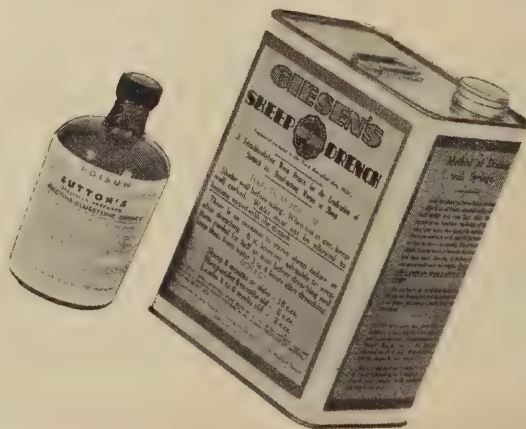
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Preparation for Maize-growing.

IN view of the increased interest being taken in the pig industry, considerable attention has been focused on the question of providing cheap supplies of winter feed. Without these, autumn litters cannot be economically carried through the winter months, and cheap supplies are obtainable only when they can be produced on the farm as part of a cropping rotation.

In the Auckland Province maize may quite well supply this requirement; in fact, in the Bay of Plenty this grain, when fed in conjunction with pasture-grazing and a little skim-milk, is responsible for much of the success of pig-farming on holdings where specialization in this branch has been practised.

Production of Crop.

A good maize crop will produce upwards of 70 bushels of grain per acre when favourable conditions are provided. On the average, autumn litters can be carried through the winter and brought to good store condition on 2 bushels to 2½ bushels of maize per pig. Thus, an acre will suffice for twenty-five to thirty pigs, but it must be borne in mind that such results will be obtained only where thorough preparation for the crop is practised.

The selected area should be well drained. An area of old pasture reasonably free from twitchy grasses is highly suitable. It is quite a good practice to feed out on the selected area, in order to enrich it with stock droppings.



Kumikumis and maize. Maize stalks make winter feed for cattle, and kumikumis serve same purpose for cattle and pigs.

Ploughing to a depth of 6 in. should take place in late winter, and the land may remain in the furrow until late September, when it should be thoroughly cultivated with disks and harrows. A further ploughing about a week or ten days before sowing will be a decided advantage, and will well repay one for the time taken. Sowing should be carried out from mid-October to mid-November, according to varieties and climatic conditions.

Useful Types.

Early Butler and Funks Yellow Dent are useful early-maturing types that can be sown late in the season. Where there is danger of frost in early November they

are preferable to late-maturing types. Of the latter, Excelsior, Horsetooth, Marigold, and Silver Queen are heavier yielding, but they require a longer growing season.

On many Bay of Plenty farms it is customary to sow cattle marrows or kumikumis with the maize. These provide very useful grazing in the winter. Perhaps the soundest method of sowing this supplementary crop is to dibble in the seed in the maize rows after the maize is through. If the kumikumis are restricted to every fourth or fifth row they will not interfere unduly with inter-cultivation.

—C. Walker, Instructor in Agriculture, Tauranga.

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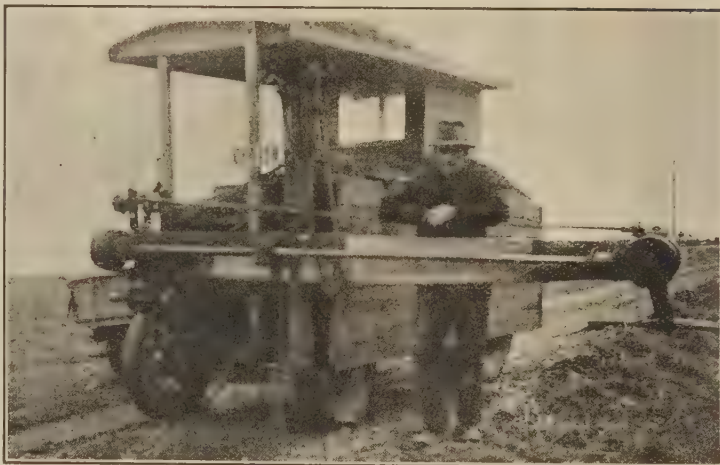
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Maintenance of Gorse Fences.

GORSE hedges have been the most popular form of shelter on many Canterbury farms for many years. Travelling through the plains area of Canterbury one sees mile upon mile of gorse hedges with their yellow blooms, some neatly trimmed and cared for, others, unfortunately, allowed to spread and thus spoil many acres of good farming-land.

It would be difficult to estimate the total mileage of gorse fences in Canterbury, but the figure must reach some thousands of miles, for not only boundary-fences but also many of the subdivisional fences are of gorse. One farm known to the writer has more than ten miles of gorse fence, and others exceed this figure.

One sees very few young hedges. Most of those now in existence were planted by the earlier settlers at a time when fencing-material was scarce and the price of wire, &c., almost prohibitive. Drainage was essential on most farm areas, and it was usual to plant the hedge on the sod banks formed when the drains were built. To the earlier settlers this provided a cheap means of fencing, and the combination of the bank and



The type of mechanical gorse-cutter which is being used by a number of farmers in the Ashburton County.

hedge provided an excellent shelter for stock in the days before shelter-belts had made their appearance to any extent.

The fact that few gorse hedges have been destroyed or replaced by modern fences would suggest that they are still

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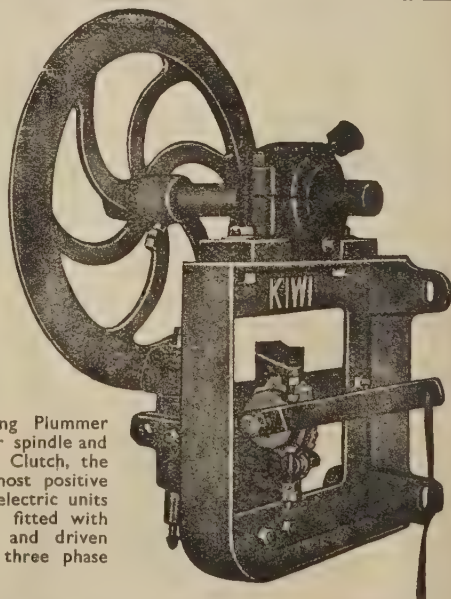
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a great asset on the farm. Excluding their value as a fence, they undoubtedly provide a good deal of shelter for stock and, to a lesser extent, crops. Many farmers will recall the time when his gorse hedge was a saving factor to his stock at certain times of the year, especially when a cold snap was experienced after shearing or during lambing.

In order to ensure efficient shelter it is necessary to cut the gorse hedge periodically; otherwise it will grow out and spread very quickly, and will become more of an enemy than a friend. Not only will it soon occupy land which would normally be used for productive purposes or grazing, but it will give the farm a neglected and untidy appearance. Neatly trimmed hedges, on the other hand, improve the appearance of the farm.

Means of Control.

The control and maintenance of gorse hedges on most farms requires considerable labour and expense, and most of the work at present is accomplished by hand, a slow and laborious task. In recent years the mechanical gorse-cutter has made its appearance, and, judging by the speed and efficiency with which the work can be done, it is surprising that more farmers have not availed themselves of this method of controlling their gorse hedges. Nor only is the drudgery of cutting by hand eliminated, but the work is accomplished at a much more reasonable cost.

The illustration shows the type of mechanical gorse-cutter which is being used by several farmers in the Ashburton County. The cutter, which is attachable to practically any make of tractor, consists mainly of the cutter-arm, to which the two double-edged knives of tempered steel are bolted in such a manner that they may revolve freely. These knives, whose efficiency depends on the speed at which they travel, are driven at from eight hundred to nine hundred revolutions

per minute by means of a belt driven from the belt-pully of the tractor on to the pulley wheel on the driving-shaft of a cutter-arm. The requisite number of revolutions per minute can be obtained with the tractor in low gear and throttled right down.

Two men, travelling at less than one mile per hour, can average two miles per day when cutting a gorse hedge in reasonable order. Furthermore, the cuttings are left in such an orderly manner that cleaning up and burning after the cutting is greatly facilitated. The balance of the cutter plant is such that if the blades strike any wire or big stones, &c., the belt will come off the pulley and so lessen the risk of straining the tractor engine. Should any damage occur to the knives, such as by chipping on stones, &c., they may be heated in a forge, beaten out into their true shape on the anvil, and the edges renewed on an emery-wheel.

Estimated Cost of Cutting.

One farmer in the Ashburton County has been using a mechanical cutter in recent years, and the approximate cost and the time taken to perform the work may be of some interest to farmers. This farmer has approximately 11½ miles of gorse fences, and the following is his estimate of the cost and time taken to cut both sides and top of all the fences on his property:—

Time taken to cut 11½ miles, 48 hours.

	£	s.	d.
Fuel, 1 drum kerosene ..	2	4	0
Oil, 2 gallons ..	0	12	0
Wages of two men for six days ..	9	12	0
Depreciation on tractor ..	1	0	0
Wages of one man, to clean and burn cuttings	9	4	0
Total cost ..	£22	12	0

There is actually very little depreciation on the plant itself. The main items of

expense attached to the maintenance of the cutter are repairs to the belt and the renewal of knives.

The mechanical gorse-cutter has several advantages. The cutter-arm is adjustable, and the topping may be done at whatever angle is required. Further, very little inconvenience is experienced in cutting the corners of a fence-line, as, in the case of topping, the fence may be completely cut and telegraph-poles may be negotiated without difficulty. The only piece missed when cutting the inner sides of the fence is the length of the tractor in each corner from which a start is made, and these small sections may be hand-cut by the man who is cleaning up behind the cutter.

—V. P. Boot, Instructor in Agriculture, Ashburton.

Vaccination of Lambs.

Vaccination against contagious ecthyma (sore mouth) with vaccine prepared at the Wallaceville Laboratory continues to give excellent results. In the Tapanui district 2,622 lambs were vaccinated, and in only one of this number did the condition make its appearance. Vaccination in the Wairarapa and Wanganui districts on farms on which the trouble was prevalent gave similar satisfactory results.—*Annual report of Director of Live-stock Division.*

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Mangels in North Otago.

FARMERS in North Otago are fortunate in that mangels give them an alternative crop to turnips, for, although the turnip crop does not suffer from disease to the same extent in this district as it does farther south, the inroads made into the crop in a normal season by dry rot are severe enough to give the farmer some concern. The mangel crop, on the other hand, is practically immune from disease. The only trouble experienced with this crop is heart-rot, which is not encountered to any extent in North Otago.

It is not generally recognized that the Waitaki County, which covers the major portion of North Otago, has the largest area of mangels of any county in New Zealand. In 1936-37 there were 1,161 acres of mangels in the Waitaki County, the county with the next largest area being Geraldine, in Canterbury, with 527 acres. Even with this large area there is room for further expansion with this crop in North Otago, for the soil and climate suit its growth, and satisfactory yields of good-quality roots are assured in a normal season, providing sound methods of field husbandry are followed. Mangels generally thrive well in coastal areas, and, if given a fairly good start, they will stand up to drier conditions than most other crops.

Production Capacity.

An important point in the feeding of mangels is to make sure that they are properly ripened before being fed to stock. If they are fed in an unripened condition stock troubles may be anticipated.

An indication of the production capacity of the mangel crop is the results obtained in this year's Farmers' Field Competitions in North Otago, where yields ranging from 60 tons to 95 tons were recorded. The season was not a particularly good one, being extremely dry in the late spring and early summer and excessively wet during the autumn months.

An outstanding crop of mangels in North Otago during the past season was that grown by Mr. W. G. Smith, of Totara. This crop was not entered in the competitions, but was weighed up independently by the writer. The usual procedure was adopted in obtaining the yield, which proved to be 138 tons 19 cwt. per acre. Mr. Smith's farm is situated some three or four miles from Oamaru on the heavy, tarry soil for which Totara and the surrounding districts are noted. The total area of the farm is 67½ acres,



Some intermediate red mangels grown in North Otago.

and, as the steading occupies some 3½ acres, the farm proper is only 64 acres in extent. Of this area, 13 acres are in permanent pasture, 10 acres in lucerne, and the remaining 41 acres are cropped in rotation.

Practice Adopted.

The practice adopted by Mr. Smith on the cropping area is to sow green-feed crops, these being composed mainly of Algerian oats. The oats are cut green and fed to the milk cows, or, in the event of the feed not being required, the green material is ploughed in. The green crops are dual purpose in that a good feed-supply is maintained and a green-manuring programme consistently carried out. Blue lupins are used for green manuring purposes occasionally, but the oats are used mainly because of their feeding-value before ploughing in. The lucerne area receives an annual application of 3 cwt. of superphosphate.

The area set aside for the production of mangels, and occasionally swede turnips, is approximately 3 acres. The varieties of mangels grown are Intermediate Red, Orange Globe, Yellow Globe, Long Red. All these varieties do well on this tarry soil, but as these soils are difficult to work it is a good practice to plough as early as possible to allow the soil to be subject to the action of the winter frosts and rains.

This greatly increases the friability of the soil, and the practice adopted by Mr. Smith of sowing oats for feeding and ploughing in further assists to decrease

the difficulty of handling these tarry soils. In addition is the production of potatoes for the early market, and the maintenance of some twenty to twenty-five milking-cows for supplying a town milk-supply.

Preparation of Land.

Mr. Smith is a keen competitor in the mangel section for show exhibits, and the growing of several different varieties enables him to obtain a good selection of roots for show purposes. The following practice is usually adopted for the preparation of land for the growing of mangels. If short rotation pastures are used they are skim-ploughed early, followed by a deep ploughing prior to the winter period, and are given good cultivation preparatory to the sowing of the crop. The crop is usually sown in a fallowed field.

This season, however, the mangels followed two potato crops, with a crop of oats for green manuring between the two potato crops. This is the first season that Mr. Smith has adopted this practice, and he is of the opinion that the procedure is more than satisfactory. His opinion is fully supported by the yield obtained. Sowing takes place early in September, a seeding of 6 lb. to 7 lb. per acre being sown on a 28 in. ridge. The usual intercultivation is carried out during the early stages of growth.

In conclusion, it may be mentioned that Mr. Smith was a successful competitor in one of the principal mangel classes at the Waikato Show this season.

—T. A. Sellwood, Instructor in Agriculture, Oamaru.

Storing of Hay: The Dutch Barn.

WHILE travelling around the countryside one very often sees badly constructed haystacks which have let in rain-water, with a consequent loss in good material. In the high-rainfall areas of New Zealand the storing of hay so that it will keep in a dry and palatable condition for the following winter-feeding often presents a difficult problem, and a haystack must be very well constructed, well topped off, and, finally, adequately covered effectively to shed rain-water.

Every farmer is not a good stacker, and some may rely on neighbours to help them out, but there are times when this arrangement is not always suitable. To-day good stackers are not plentiful, and anybody who is a good hand at building stacks is very much in demand at harvest-time.

The provision of a Dutch barn will overcome many problems in the storing of hay, and in wet districts it is particularly valuable during the harvesting

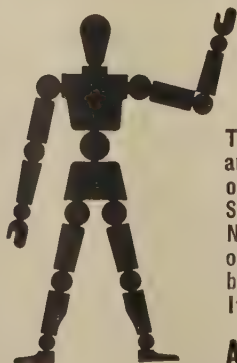


A sketch of a Dutch barn, the uses of which are discussed in this article.

operations. Should wet weather be experienced during harvest, all hay that is already in is dry and under cover.

Perhaps to-day the cost of constructing a hay-barn is fairly high, but much of the material required can often be

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obtained on the farm or can be bought second-hand. Iron for the roof may be taken off some old building that is of no further use, and the timber required may also be obtained in this way.

Uprights are more important, as they must carry the weight of the roof and be

strong enough to withstand winds and sudden strains. Disused railway-rails or light tramway-rails are very suitable for uprights, and can be obtained at a nominal figure.

A ton of new hay occupies a space of approximately 400 cubic feet, so that

a barn measuring 30 ft. by 15 ft. and 14 ft. in height will hold 10 tons of hay. With baled hay, a greater tonnage can be stored, as the material can be stacked right up to the roof.

—J. M. Hopkins, Instructor in Agriculture, Taumarunui.

The Raising of Shelter-trees.

THE raising of shelter-trees from seed has been practised successfully for many years by Mr. A. J. Mathews on the Kaitia drained swamp. Of the 40-odd species now growing on Mr. Mathews's farm in a locality with a poorly drained clay soil where there is always danger of scalding by salt-bearing winds from the west coast, the two species which have been most successful are undoubtedly macrocarpa (*Cupressus macrocarpa*) and the gum-tree (*Eucalyptus botryoides*).

The advantage of these two species is that they have grown well under the prevailing conditions, and that they yield excellent timber after a long life of service as shelter and shade trees.

Gathering the Seed.

Mature macrocarpa cones are gathered any time between January and July and spread on a dry floor to open. Some of the seed falls out and can be swept up, the remainder being removed by placing the cones in a sack and beating.

E. botryoides nuts are gathered during early November and are spread on a newspaper to dry, as the seed is very small—in fact, like dust. When the nuts are dry the seed is obtained by shaking them in a tin or basin.

Sowing.

Best results are obtained by sowing macrocarpa in September and *E. botryoides* in December in a very fine seed-bed, well

consolidated, and without fertilizers, in rows 4 in. wide and 18 in. apart.

It is essential to provide a frame with a $\frac{1}{2}$ in. or $\frac{3}{4}$ in. mesh wire-netting cover as a protection against birds, which are particularly destructive of seedling trees until they attain a height of at least 3 in. The frame should be easily removed and replaced for weeding, as the trees are very susceptible to disease if weeds are allowed to prevent the free circulation of air between them.

During a dry spell, watering with a fine rose towards evening is necessary, and covering with hessian is an advantage provided the plants are allowed to harden off gradually by lifting one side of the frame for a fortnight before finally removing. Discretion is necessary in this

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matter, as both strong light and dry wind will injure tender vegetation grown under sheltered conditions.

Transplanting.

Transplanting is done during May, and, to ensure success, should be preceded by the practice known as "wrenching." This takes place six weeks before transplanting, and is done by going along both sides of the rows with a spade, which is inserted at such an angle as to cut the

roots of the young trees at from 6 in. to 9 in. below the surface. The spade handle is then pushed down to prise the soil of the rows up slightly, ensuring the complete severing of the roots, after which the soil is pressed back into place. Wrenching causes the young trees to throw out numerous fibrous roots, which are of great assistance in re-establishment after transplanting.

Mr. Mathews abhors the planting of single rows of trees, particularly of macrocarpas, which are liable to blow over in

a gale. He considers that a shelter-belt should be at least three, and preferably four, trees deep, the little extra land being well paid for by the greater efficiency of the shelter. He also finds that one-quarter-acre-clumps strategically placed in the corners of paddocks are most effective as wind-breaks, as well as providing shade for stock in summer and a warm, dry bed in winter.

—E. Moss, *Instructor in Agriculture, Kaitia.*

Hay and Ensilage Crops.

FIELDS intended for hay and ensilage will now be well forward. So far as Auckland provincial farmers are concerned, greater attention will probably be given these crops this year. Lack of adequate supplies during the period of acute shortage last summer probably intensified losses during the subsequent facial-eczema outbreak.

Even apart from this consideration, the reserves of hay and ensilage are seldom sufficient adequately to provide for good winter-feeding and also to meet an emergency such as was experienced last summer. The obvious policy should be to save as much surplus grass as possible, even although it may entail much extra labour. The costs of saving

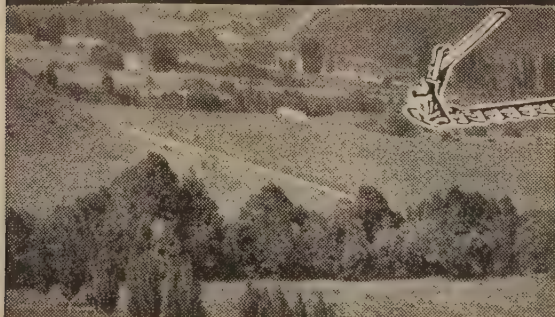
added supplies are only an insurance premium when compared with the considerable losses caused by shortages of feed.

At the present time farmers should make a careful check of all implements and harvesting-machinery, and improvised fittings should be replaced by more serviceable equipment. Delays through

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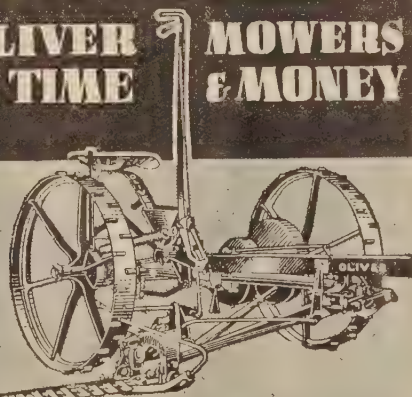
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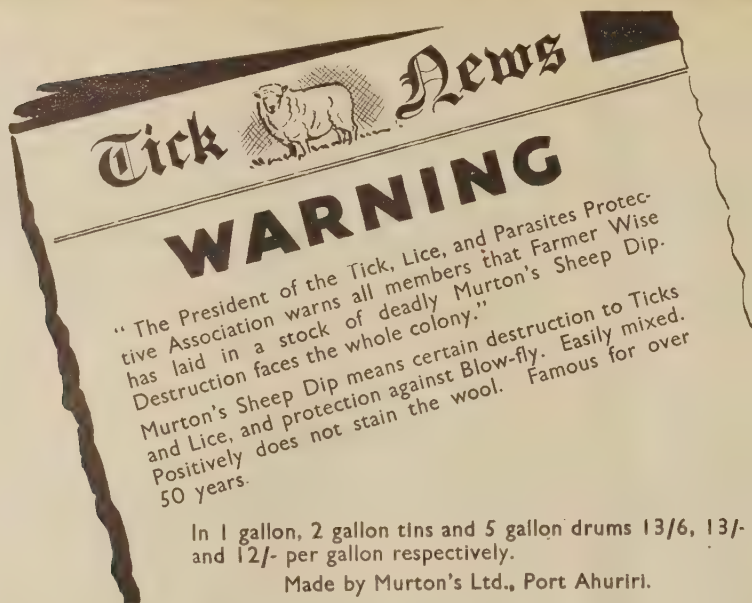
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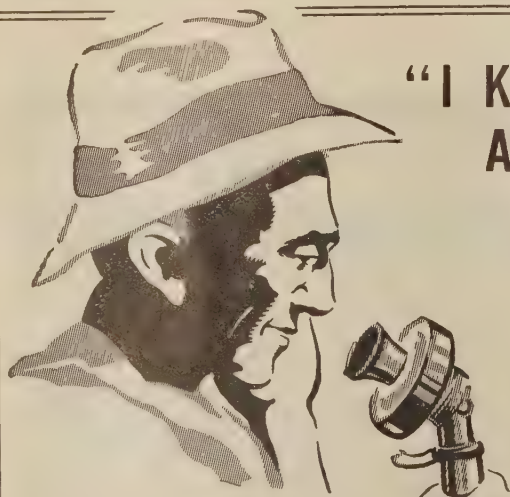
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inefficient implements are most annoying and costly when they enforce idleness on a number of men. It would be good advice, then, to take advantage of every opportunity to check over thoroughly every piece of equipment, to grease and oil machinery, to sharpen knives, and generally to have everything, including a reasonable supply of spares, in first-class condition.

Many hay and ensilage crops are held until the material is too mature. The most nutritious stage is reached prior to flowering, so that crops should be cut when the first seed-heads of the grasses appear. Not only will this result in better-quality hay and ensilage, but it will do least harm to the pasture. Furthermore, pastures which are cut early will make good growth again before hot

summer conditions set in. Subsequent to cutting, a dressing of fertilizer will be found very beneficial in promoting quick recovery in the pasture.

For some districts special crops can be grown for hay and ensilage. Information on this subject can be obtained on application to district Instructors in Agriculture, who will have an intimate knowledge of the crops best suited to their localities,

—C. Walker, Instructor in Agriculture, Hamilton.

Utilizing Drainpipes for Drinking-troughs.

A very serviceable water-trough which is cheap and simple to construct can be made by using a 2 ft. 6 in. concrete pipe 4 ft. in diameter as illustrated in Fig. 1.

The pipe is set in an upright position on the site where the drinking-trough is required, and is sunk 4 in. to 6 in. in the ground. The earth inside the pipe is also excavated to a depth of 3 in. to 4 in.

The pipe is then levelled by placing suitably sized stones under the low side. A few larger stones are placed against the outer side of the pipe to hold it in position. All that is left is then to fill the bottom with concrete to a depth of 3 in.

If the supply-pipe enters the trough through the bottom a chain and ball-cock is best put in position before the concrete floor is completed.

A prominent farmer in the Whangarei district has watered most of his paddocks with troughs constructed in this manner at a very small cost. Construction costs are about half of those entailed in building the same sized troughs on the site with the aid of moulds.

The drainpipe costs £1, and the material used for the bottom amounts to only a few shillings. Thirty shillings will cover the total cost of erecting this style of trough.

—E. B. Glanville, Instructor in Agriculture, Whangarei.



Fig. 1.—A drinking-trough constructed with a concrete pipe similar to that shown in Fig. 2.



Fig. 2.—A concrete pipe 2 ft. 6 in. long and 4 ft. in diameter, with 3 in. walls, which can be utilized for forming the walls of a useful drinking-trough.

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Hygienic Covered Stripping-bucket.

ONE of the main concerns in the milking-shed on the "feed-flavour area" at Ruakura Farm is to produce cream which has no faults other than feed-flavour. It is desired to obtain the cream free from dirt and as free as possible from undesirable bacteria. This means that the cows must be healthy, the milker fastidiously clean, and contamination of the milk after it has been drawn must be prevented. If a cow becomes sufficiently unhealthy she is replaced by a healthy cow from one of the other herds on the farm, so that there is no difficulty in procuring healthy cows.

To prevent contamination of the milk after it has been drawn, some precautions unusual in New Zealand are taken. The main one is the use of a covered stripping-bucket. This utensil, when properly used,



Fig. 1.—The covered bucket used at Ruakura.

[H. Drake, photo.]

prevents visible contamination of the milk by dirt, dust, and cow-hairs falling, or by dung splashing up from the ground into the milk. It also prevents invisible contamination which may be caused by dirt, which, without some kind of covered bucket, usually gets into the milk to some extent and becomes broken down or partly dissolved in it, as well as carrying bacteria. No strainer, however efficient, will remove either dissolved dirt or bacteria, and the only way to produce clean milk and cream is to prevent them from becoming dirty.

Covered Bucket Described.

The illustrations clearly show the design and parts of the covered bucket used at Ruakura. The opening is as small and as vertical as will permit of stripping

into it without missing it altogether. The lid holds in place a piece of sterilized muslin, through which the "strippings" pass. This muslin is not a strainer; it is there simply to catch any dirt or dung which may fall, be blown, or splashed on to it. The cloth is changed immediately any dirt is caught on it.

Milk is not strained through the cloth over dirt, as happens when a strainer becomes dirty during use, as this would be, perhaps, as bad as or even worse than allowing the dirt to fall into the milk. A strainer in itself may constitute a source of greater contamination of the milk which is being strained than if it were not used. It is therefore emphasized that this cloth is simply an interceptor of unavoidable dirt and not a strainer or collector of avoidable dirt.

Use Justified.

It was difficult at first to strip accurately into the small opening of this bucket, and the milker was inclined to deride its use, but experience overcame this objection, and the cleanliness of the milk and cream produced amply justifies the use of the covered bucket in this shed.

Perhaps some dairy-farmers who aim to produce absolutely clean milk and cream, particularly those who supply whole milk for domestic use, may overcome initial prejudice sufficiently to try out a covered bucket. In other parts of the world it is used extensively.

As a further precaution against dust and dirt falling or blowing into the milk or cream in the feed-flavour shed the vat and cans are covered with muslin, as shown in Fig. 3.

"Wet-milking" is, of course, prohibited in this shed, but, as "dry-milking" in the strict sense is difficult, a little vaseline of good quality is used



Fig. 2.—Showing the parts of the covered bucket.

[H. Drake, photo.]

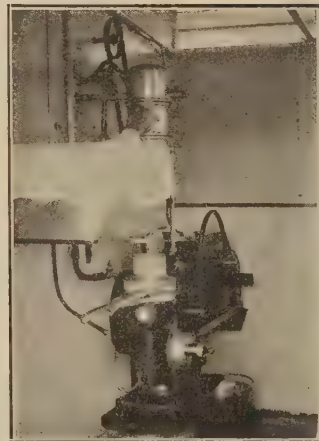


Fig. 3.—The covered vat in the separator room at Ruakura.

[H. Drake, photo.]

as a lubricant. Moistening the cows' teats and the milker's hands with milk is an undesirable practice to say the least, and should not be tolerated in any shed.

—E. R. Marryatt, Fields Instructor,
Ruakura Farm.



Wages for Dairy-farm Workers.

BY the Agricultural Workers' Wage-fixation Order 1938, which operates from 1st August, 1938, until 31st July, 1939, and thereafter until a further Order is made, the minimum rates of wages payable to workers on dairy-farms are fixed as follows:—

	Pe	Week.
	£	s. d.
(a) For workers under 17 years of age	1	0 0
(b) For workers 17 years of age but under 18 ..	1	6 6
(c) For workers 18 years of age but under 19 ..	1	13 0
(d) For workers 19 years of age but under 20 ..	1	19 6
(e) For workers 20 years of age but under 21 ..	2	6 0
(f) For workers 21 years of age and upwards ..	2	12 6

Where board and lodging for dairy-farm workers is not provided the rates so fixed shall be increased by £1 per week.

Section for Irrigation Areas.

Contributed by Officers of the Fields Division.

Response of Clovers to Irrigation.

THE clover content of to-day's permanent pasture is the measure of its productivity. Every writer and speaker on pasture improvement and maintenance emphasizes the importance of keeping up the clover content of the sward if high-producing permanent pasture is to result (Fig. 1). The reason given for the importance of clover is its ability to supply nitrogen in a readily available form to the grasses of the sward, and nitrogen is the most important factor in the growth of all the grasses.

Common Objective.

Throughout New Zealand we have therefore one common objective—that of introducing and maintaining in the pasture sward clovers which will live and grow in harmony with the grasses and which are of such a type that they will produce abundantly over the greatest period of the growing season. It is evident from reading and hearing lectures that where the correct strains are sown this desirable result can be brought about in the North Island chiefly by the application of phosphates.

There are other factors affecting the result, such as management, and in certain places other fertilizers and lime, but the general recommendation for the North Island is phosphates. It would further appear that the farmers themselves in the North Island have become fully aware of the importance of the clover content of the permanent pasture sward. This consciousness can only have resulted from the farmers seeing for themselves what clovers mean to their pastures, and their consequent returns.

Canterbury Pastures.

In the South Island, especially in the drier areas, such as Canterbury and Marlborough, from whence, incidentally, the

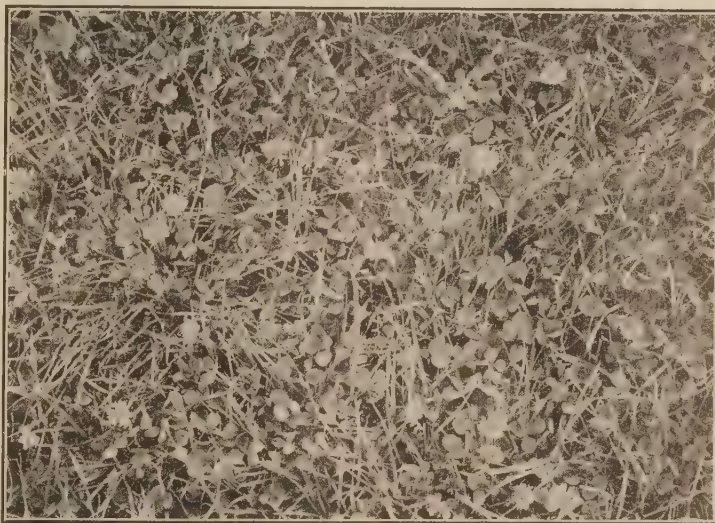


Fig. 1.—High-producing permanent pasture under irrigation. Note the good rye-grass and clover swards.

[H. Drake, photo.]

greater portion of our clover seed comes, the importance of the clover content of permanent pasture is not fully recognized by farmers. This is undoubtedly due to the fact that under normal conditions in these areas clovers, because of their short growing season, are unable to exert their full beneficial influence in the sward.

J. W. Calder, of Lincoln College, in a paper given at the Grassland Conference in 1936, recognizing the need for improved clover growth in Canterbury pastures, mentions the following points which should be carried out in endeavouring to encourage clover growth:—

- (1) The sowing of improved strains of certified white and Montgomeryshire red clover.

- (2) Sowing at the correct season of the year to ensure successful establishment.
- (3) Adequate liming and manuring.
- (4) Correct grazing management for the benefit of the clovers.

He also mentions that the sowing of subterranean clover will ultimately have the result of improving Canterbury pastures. It has been proved that attention to these points has improved the clover content and, consequently, the pasture wherever they have been carried out in Canterbury.

Standard not reached.

The fact remains, however, that even with these points being thoroughly exploited the standard of Canterbury, Otago,

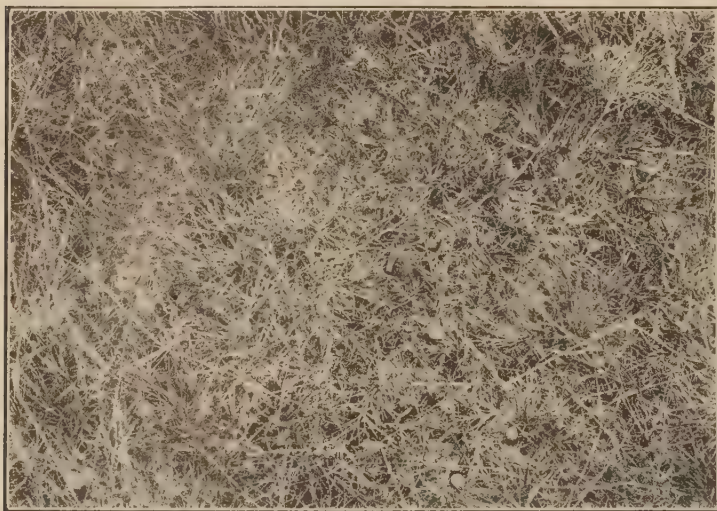


Fig. 2.—A poor sward due principally to lack of clovers. If vestiges of clover remain in the sward they rejuvenate under irrigation (see Fig. 3).

[H. Drake, photo.]

and Marlborough pastures has not reached that of the North Island. To find the reason for this one only has to ask any farmer on these areas, and the reply will be: "You can't expect to get pasture here like the North Island. We don't get the rain they get there."

If the above remark is right, and assuming that clovers are responsible for the health and strength of permanent pasture, the rainfall is then the chief limiting factor in clover growth on the light soils of the South Island. Two years' results from irrigated pastures in Canterbury have proved this to be the case. Under proper irrigation, where the manurial requirements have been satisfied, clovers thrive with a vigour equal to that of the North Island, and similar benefit to the associated grasses ensues.

Attention to Clover Content.

In all cases proper irrigation of pasture has resulted in increased clover growth, and, further, old, worn-out pastures which, prior to irrigation, were practically devoid of clover have become well filled with volunteer white clover, thereby rejuvenating the sward (Figs. 2 and 3). From observation it has become apparent that clovers are the first plants in the sward to benefit from irrigation. It is therefore essential that, where pastures are sown with the intention of irrigating, due attention should be given to the clover content of the mixture used, and the farmer should not depend on the fact that "my land is full of clover seed."

On the demonstration area at Mr. W. R. Hammond's farm on the Winchmore Irrigation Scheme in Ashburton the

is responsible for the bulk of the clover growth. The results from this 36-acre field will be published in the *Journal* when sufficient material is available. It is sufficient at this stage to emphasize the fact that the difference between the irrigated and non-irrigated areas lies solely in the clover content of the sward.

Guide for Irrigation.

Another important fact worthy of note is that, while the clovers respond so readily to moisture, they are also the first species to suffer when an excess of moisture is present. They can serve as a valuable guide to the irrigator, therefore, as to whether he is irrigating efficiently, as any effects of over-irrigating will be immediately reflected in the clover growth. It is therefore essential that fields should be laid out in such a manner that they can be irrigated quickly without having water running over any one part longer than necessary. Provision must be made for any surplus water to be carried away and prevented from lodging on parts of the field.

Under irrigation, the clovers become the indicators of the good or harm being done to a pasture.

Generally speaking, the results obtained on irrigated pastures over the last two seasons would indicate that irrigation will ultimately become as important a factor in South Island pastures as phosphate is now to those of the North Island.

—W. C. Stafford, Instructor in Agriculture, Timaru.

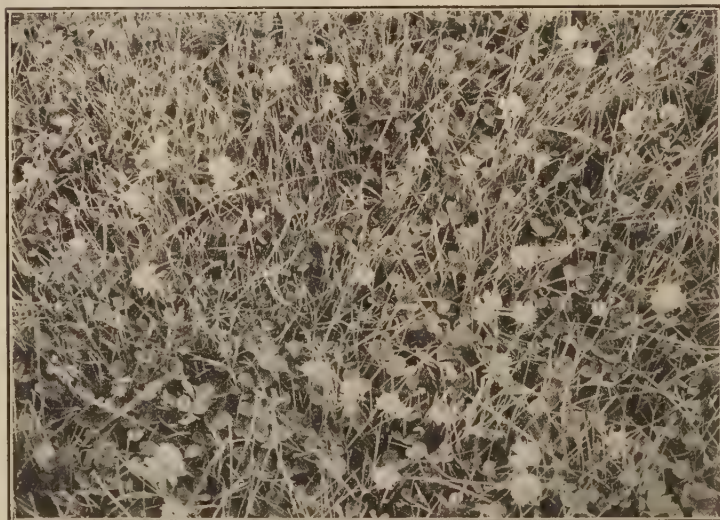


Fig. 3.—A poor sward after one season's irrigation, which has rejuvenated the clover and generally invigorated the sward.

[H. Drake, photo.]

Horticultural Instruction.

Contributed by Officers of the Horticulture Division.

Orchard Notes.

Control of Pests and Diseases.

PREVIOUS notes gave an outline of the general spraying programme to follow for the whole season. The period prior to the blossoming of fruit-trees covers the first phase in the general disease-control programme, which consists, firstly, of an application of an insecticide during dormancy to destroy adult scale insects and red-mite eggs, thus giving a period of freedom from these pests, and, secondly, applications of certain fungicides used to destroy overwintering spores of fungi causing disease, and later, applications to protect the embryo fruit from subsequent infection as the blossom buds expand.

A new phase in the disease-control measures for apples and pears begins with the falling of the petals, as at this period other insect pests begin their activities and have to be dealt with at the same time as the fungous diseases, necessitating the use of combination sprays at a time when fruit is most liable to injury. Considerable care is therefore required in avoiding damage to fruit and foliage, and the choice of materials must be made with due regard to the tenderness of the variety and condition of the trees.

Spraying of Apples.

For most apple varieties under average conditions, lime-sulphur 1-150 plus colloidal-sulphur 2 lb. to 100 gallons is the most effective fungicide for summer use. It is more effective than either material used alone, and appears to be less damaging than lime-sulphur without colloidal-sulphur. The combination has the further advantage of keeping red mite in check during the early summer period, thus delaying an attack sufficiently heavy

as to necessitate the use of a summer oil until a later period when such may be applied with greater safety.

As the season progresses and growth slackens, lime-sulphur must be reduced in strength to at least 1-200, and, under some circumstances, even more. In the case of varieties such as Cox's Orange and Dunns, which are rather intolerant of lime-sulphur in some districts, it is advisable to delete lime-sulphur altogether as a summer spray and use colloidal-sulphur only. The same would apply to trees in rather weakened condition or carrying an excessively heavy crop.

In northern districts codlin-moth is usually active by petal-fall. This necessitates the introduction of arsenate of lead into the spray mixture at this period. Injury is frequently caused by water-soluble arsenic, the trouble occurring chiefly where spraying water shows a high degree of temporary hardness, as in Hastings.

By mixing hydrated lime at the rate of 3 lb. to every 1½ lb. of arsenate of lead the water-soluble arsenate is reduced to a safe percentage. When lime-sulphur is mixed with arsenic the water-soluble arsenic is increased very considerably, but the hydrated lime will rectify this undesirable state. It is necessary to stress the importance of using hydrated lime with all arsenate applications, but especially when used in combination with lime-sulphur.

Apple Leaf-hopper.

Apple leaf-hopper is likely to make its appearance any time after trees have come into leaf. A spray of nicotine sulphate, 1-800, will effectively deal with

this destructive pest if applied while the hopper is still in the nymph stage, but it is difficult to destroy once it becomes winged. The nicotine may be incorporated in any spray applied in the summer, but, to be fully effective, requires to be applied on a warm, still day.

Spraying of Pears.

The continued use of Bordeaux mixture, unless at weak dilutions, will produce a roughening of the skin of the fruit, which is rather detrimental from the point of view of export. If the initial sprays are thoroughly applied black-spot should be so satisfactorily controlled as to allow for the use of sprays as recommended for apples as a summer treatment. However, on such varieties as Winter Nelis grown in humid climates, and where complete control has not been secured, Bordeaux mixture 3-4-50 may be required for several applications following petal-fall.

Spraying of Stone-fruit.

The continued spraying of peaches with sulphur sprays is necessary for the control of brown-rot, shot-hole, and leaf-rust. Lime-sulphur 1-200 plus colloidal-sulphur 2 lb. to 100 gallons should be applied at intervals of three to four weeks. Such summer applications are frequently withheld, and invariably leaf-rust occurs, which causes considerable defoliation.

Japanese plums require to be kept under close observation during the next month, particularly because of possible attack by black-aphis. Spraying with summer oil 1-100 is recommended as a control, concentrating the spray as far as possible on the colonies observed.

Cultivation.

Land should now be in good tilth throughout the orchards. It is necessary for the conservation of moisture to keep the surface soil loose by frequent light cultivations and so to prevent, as far as possible, the soil from becoming dry and cracked. Poor cultivation or lack of cultivation is soon reflected in a weakened tone of foliage, and foliage so weakened will readily suffer spray injury.

Fruit-thinning.

Fruit-thinning is a most important factor in producing high-quality fruit. The weight of fruit harvested from a well-thinned tree is often greater than that from a tree left to mature the whole of its crop, as the remaining fruits are so much larger on the average. Undersized fruit is expensive to pick, to grade, and to pack, and is of lower value generally. Uniformity in size may be secured by careful thinning and the removal of diseased and blemished fruits in the process.

Stone-fruit should be dealt with first, beginning early in November with Wright's Early, Evan's Early, and Burbank plums; then other stone-fruit, followed by pears and apples. Peaches should be so spaced as to ensure that no two fruits are touching when mature. This is an important point in brown-rot control.

Disbudding and Grafts, &c.

Newly-planted trees will require some attention during November. A limited number of well-spaced shoots should be selected to form a good head, and other shoots lower down the stem should be rubbed off. Scions on newly-grafted trees will be swelling, and ties will require cutting, as injury may otherwise be caused by the tying material cutting in. Scions are often broken off by wind, and it is a wise plan to tie the new shoots to stakes attached to the stocks.

Orchard Equipment—Ladders, &c.

The work of fruit-thinning, pruning, and picking is greatly facilitated in larger trees if good orchard ladders are provided. As much of the work is seasonal and is carried out by seasonal workers, some of whom may be unaccustomed to the manipulation and use of ladders about trees, ladders employed should be light and easily handled and safe.

The type of ladder generally favoured is one with parallel legs and full-length bent stays, giving a broad base and back legs converging to a single prop support, which may be placed close to the tree trunk without causing damage to the tree.

Frost Protection.

Orchardists in districts subject to late frosts appreciate the practicability of frost protection by heating. The question as to whether the expense of orchard-

heating for such protection is warranted must be determined by each grower studying his own problem and estimating how frequently and to what extent he is liable to suffer from frost. It may possibly be found that only certain portions of the orchard are likely to be affected, in which case it may be advisable to grow thereon varieties more frost-resisting—i.e., change over from early-blossoming stone-fruit to late-blossoming apples. If damaging frosts are of such frequent occurrence as to necessitate repeated heatings of the area it may prove that fruitgrowing is likely to be impracticable, and under such circumstances the attempt should be abandoned.

Instances occur where blocks of Japanese plums fail to produce a crop except at rare intervals, the reason being unsuspected frost damage about blossoming and petal-fall. Probably at this time the major crops are not at a stage to give concern, and frost observations are not so keen. This is an instance where one should either provide for heating or remove the trees and replace them with something more frost-resisting.

If orchard-heating is decided on, temperature surveys on cold nights should be undertaken to ascertain how the various parts of the orchard are affected. Advice should then be sought in regard to equipment, lay-out, and procedure.

—N. J. Adamson, Orchard Instructor,
Hastings.

Citrus Notes.

Spraying for the Current Season.

OCTOBER sees the start of the citrus-spraying programme for the current season. With the new grading regulations now in operation and the many diseases present in this country, a thorough and efficient spray programme is as essential for the citrus-grower as for any other class of fruitgrower. The losses sustained by some growers because of red-scale infestation last summer will prove that a well-planned programme is now vital to success.

Before discussing such a programme it is necessary to repeat that "Prevention is better than cure"—a spray programme is outlined to prevent an outbreak of disease. Remedial measures are required after an outbreak, whether it be for red

scale, verrucosis, or thrips, the necessary action will be much more drastic than in a programme for prevention.

Classification of Diseases.

Before outlining a programme it is necessary to grasp the fundamentals of spray control, the type of disease, and the manner in which control can be effected. A general classification is:—

- (a) Bacterial diseases.
- (b) Fungus — ectoparasitic and endoparasitic.
- (c) Insects—chewing and sucking.
- (d) Physiological.

No spray programme is effectual against bacterial and physiological diseases, which require special treatment.

Of the fungus diseases, the most common and destructive in the field are verrucosis, bark-blotch, collar-rot, and brown-rot.

Practically all citrus-fungus diseases are endoparasitic—that is, the infection grows within the fruit or leaf tissues. Spraying for such diseases will check them, but it will not rectify damage already caused. It is therefore necessary to coat the plant tissues with a spray such as Bordeaux, which is toxic or poisonous to the spores or germinating cells of the fungus. Bark-blotch and collar-rot require special treatment.

Control of Insect Pests.

An arsenical spray or stomach poison will control chewing insects if they chew the foliage; hence, basic arsenate of

lead will control leaf-roller caterpillar. In the case of a weevil and the borer other methods of control are required, and will be dealt with later.

The most dangerous of the sucking insects is the red scale. This is a dry-season pest, and hence the quantity of fruit affected last summer. Although a late oil spray applied in April or May will probably destroy the greatest percentage of red-scale larvæ the fruit affected cannot be marketed. If the oil spray is applied earlier the growing fruit will shed the dead scale, and the fruit may be marketed in a clean condition.

Another insect, piercing and sucking, is the thrip. Thrip damage results in a type of silvery russeting on fruit and foliage. Thrips gradually exercise a very detrimental effect on trees, and one may observe many of the largest trees in a grove so affected by thrip damage that there is practically no fruit and the tree simply stands still—a liability to the orchardist.

By the successful spray control of the above chief diseases—verruccosis, red

scale, and thrips—most of the minor infections of grey scab, brown-rot, black scale, and sooty mould and black aphid, will be also controlled, so that by the judicious application or variation of the suggested citrus-spray programme the practical fruitgrower should achieve disease control.

Importance of Coverage.

One most important point is coverage. In all cases where control depends upon the spray actually hitting the insect or completely coating the foliage, the careful application of sprays cannot be overstressed. Be thorough. First spray the inside of the tree in every direction, and then continue with the outside. Do not permit a portable outfit to keep in continual motion while spraying an orchard unless the trees are only up to two or three years old.

The spray programme recommended up to the end of December is as follows:—

Lemons—

October: Bordeaux 3-4-50 for verrucosis and brown rot.

November: Bordeaux 3-4-50 and 1 in 100 summer oil for verrucosis and black scale.

Oranges—

November: 1½ lb. basic arsenate of lead powder per 100 gallons.

December: Water for leaf-roller caterpillar.

The schedule for red scale control will be published next month.

Cultivation.

Every effort should now be made to effect a good tilth in the orchard. Ploughing should be completed as soon as possible and hoeing begun around the trees.

Manuring should be completed while there is still sufficient moisture to make the manure available for the spring growth.

Every effort should be made to clear the trees of any excess fruit which would inhibit spring growth and the setting of the current season's crop.

—L. Paynter, Orchard Instructor, Auckland.

Viticulture.

Phylloxera-resistant Stocks.

WHEN *Phylloxera* was discovered in New Zealand some forty-five years ago it was found necessary in affected areas to graft both table and wine varieties on to pure American and hybrid stocks. These resistant stocks are natives of the eastern states of America, from whence *Phylloxera* was inadvertently introduced into France with American rooted vines in 1861. It multiplied and spread over Europe at a very rapid rate, and in 1874 was established there in most of the vine-growing countries.

The native American vines imported into France were seedlings, and some thousands of different types of these have since been tried out and are still being selected in that country and elsewhere. The principal points aimed at in selection are the highest resistance to *Phylloxera*, the greatest production of fruit, the maximum affinity between stock and scion wood, good knitting and rooting powers, adaptation to soil and climatic conditions, and general response to propagation operations. Resistant

stock which answer these conditions are propagated by cuttings, as vines produced from seeds seldom reproduce all the characteristics of the parents, even when they themselves were grown from cuttings of the same variety.

It has been found during selection that many of the stock vines would not readily unite to scion varieties. Some had too vigorous a growth and others too slender a growth, and, finally, some were not sufficiently resistant to *Phylloxera* and other pests and diseases.

Native Vines.

The native vines growing in the habitat of the *Phylloxera* suffer very little from that insect—some of them receive practically no injury. According to Foex:—

"In the case of *Vitis vinefera* (European varieties) the penetration of the medullary rays causes, after a certain number of attacks, the consecutive alteration of the fibro-vascular bundles, the anatomical elements of which become penetrated

by liquids charged with decomposition products derived from the cellular tissues, resulting eventually in the destruction of the roots. In the case of the resistant American, surface damage only occurs, which ends with the cicatrization of the tissues and the formation of a sort of scab, which is soon detached owing to the production by the conjunctive tissue of the bark of a corky layer, which isolates the damaged part."

According to Ravez:—

"The most resistant vines are those which are least attacked by the insect. But why does it attack them unequally? Solely because the roots of certain species are pleasing to it, while others please it less. It is, as a matter of fact, the taste of the roots which directs the insect and causes it to choose. When it has not the choice it may invade even the most resistant vines, but then with only very slight intensity."

The Disease in New Zealand.

The *Phylloxera* is found in New Zealand on both roots and foliage of vines. The root form is known as *phylloxera vastatrix radicola* on the roots of European vines, and the leaf form is known as *phylloxera vastatrix gallicola* on some of the direct producers which are hybrid European-American vines. None of the leaf form has so far been discovered on the foliage of the American stocks. The presence of the leaf form on the vines does not cause much apparent damage, but it is one of the several forms the insect goes through in the course of its

complicated life-cycle—the sexual form, the leaf form, the root form, and the winged form.

The root form is the one which does the damage, causing nodosities to form on the tip of the rootlets and tuberosities on the older roots where they have pierced the bark to suck out the sap. Soil bacteria enter the wounds made by the insect's proboscis, and the roots are destroyed, causing the eventual death of the vine.

The insects can multiply on the roots only, as is evident from the fact the leaf form was noticed more than thirty years

ago in New Zealand, and again last year in the Auckland Province, but it was not noticed in the intervening period.

The principal vine stocks available for grafting purposes in New Zealand are mostly American x American hybrids and Vinifera x American hybrids, which have almost entirely superseded the pure species. The main reason for hybridizing has been to breed out the faults of the pure species while retaining the qualities desired for propagation. These stocks will be dealt with individually in next month's issue.

—J. C. Woodfin, *Vine and Wine Instructor, Te Kawhata.*

Cool Storage Notes.

Freezing Injury in Cool Storage.

MOST fruit in cool storage is now nearing the end of its life. Only fruit which has been grown and cool stored under good conditions will retain its appearance, firmness of texture, and distinctive flavour.

Wilt is prevalent in some varieties of apples and pears which are now coming out of cool storage. It has been found that fruit in cool-stores which rely on direct-expansion cooling without forced air-circulation has a much brighter appearance (or bloom) on removal from cool storage late in the season, and that wilt is overcome in both apples and pears.

The storage conditions obtained by direct-expansion cooling without air-circulation are a more even distribution of cool air without over-rapid cooling and an effective control of humidity by the equal distribution of the cooling-coils over the ceiling of the cool-chambers.

Full control of humidity and temperature is obtained by the installation of modern defrosting equipment.

Cool-storage owners would be advised to procure a tested thermometer for the purpose of keeping a check on the thermometers used in cool-chambers. These thermometers should be tested at the lowest temperature they are required to register. Freezing is usually found in cool-stores where low temperatures are necessary. In chambers which

are used for pear storage the fault is very often found to be in an incorrect thermometer. Fruit will often be damaged by freezing if stacked too close to the cooling-coils.

Once fruit has been frozen the texture is effected, and it is of no further use.

Even though it may be thawed out and appear to come back to normal the quality and flavour have been destroyed, and it is therefore rendered unfit for consumption.

—A. Powell, *Cool Storage Officer, Wellington.*

COMMERCIAL FERTILIZERS

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A.J.

Vegetables, Small Fruits, and Flowers.

Contributed by the Horticulture Division.

The Control of Weeds.

NATURALIZED plants, known as weeds, are the traditional enemy of the cultivator, who often has a difficult task in protecting young crop plants from being overwhelmed with them before they can get established. In the case of herbaceous crop plants, which include most vegetables and many flowering plants grown in an open situation, the difficulty is greatest.

The vigour and vitality of "couch" grasses, convolvulus, or oxalis when they are the principal weeds present make them serious enemies. Where the land is free from obstruction, couch grass or oxalis may sometimes be eradicated by trenching under, or a heavy green crop may be grown, such as field peas, which will smother the weeds. Another method is to maintain a clean fallow during a dry summer period, gather in the roots of the couch by means of harrows and burning them when dry. This is more easily done when the grass has been undisturbed for some time and the roots are near the surface.

Smother Crop and Spraying.

By ploughing just sufficiently deep to get beneath the roots they are kept well within the reach of the harrows and more easily brought to the surface during the successive strokes of that implement. If the dry weather does not continue sufficiently long to complete the work, a smother crop may be required to do so, or at least prevent re-establishment of the weed. The roots of the convolvulus are more tender and cannot be dragged from the ground, and they also penetrate deeper than the preceding.

A light spraying with a sodium-chlorate solution during dull weather in summer when the plants are in full growth is probably the most successful method of making headway in the control of this serious weed. It should be clearly understood that land for cropping which is seriously infested with such weeds as the

above-mentioned is heavily depreciated in value, as it is of little use until they are completely eradicated.

Soil for seed-boxes or potting often contains weeds in the form of seeds or roots, which make a great deal of tedious work, especially when it comes to removing the seedling weeds from among a seedling crop. This has led to the now well-established practice of destroying the weeds—and, incidentally, insects and fungi—in the soil before using it by means of heat.

Steam is liberated into it through perforated pipes until the temperature rises to the vicinity of 200° F., and, if it is well covered up, this can be maintained easily for the twenty minutes or so necessary to have the desired effect. Dry heat may also be applied, and it is most effective if the soil is in a covered vessel so that it does not dry out. It is a waste of time and fuel to overheat the soil, and, indeed, it may seriously depreciate its condition and constitution.

Preparing Land for Sowing.

Where land is being prepared for sowing or planting a crop of a herbaceous nature the deep cultivation of the soil, ploughing under organic manure, and the broadcasting or drilling of artificial fertilizers before sowing are normal features of good preparation, but it is also important to allow the land to lie untouched afterwards for a week or so to allow weed-seeds near the surface to germinate, so that on a fine day when the soil is in condition the land may be harrowed and the young seedling weeds destroyed before they have developed true leaves.

In doing this, care must be taken not to disturb the ground too deeply, or more weed-seeds may be brought up near to the surface.

Potato Crops as Cleaners.

Potatoes are often grown mainly with a view to cleaning the land, and it is

frequently the best possible treatment in the final preparation of land before planting perennial crops, which make effective and economical cleaning impossible while the land is so occupied. There is, of course, nothing inherent in the potato plant which has the desired effect, and if the crop is carelessly grown the object will not be attained. When the potatoes are properly grown, however, the surface soil during the various necessary operations is kept moving sufficiently often to destroy all weeds before they get established, and by the time the potatoes are dug the land is clean and the tilth much improved.

The commonest mistake is to neglect the land between the time of sowing the potato crop and the appearance of the young shoots through the surface of the ground. A heavy crop of weeds may become firmly established during that period unless the ground is harrowed in fine weather as soon as the seedling weeds appear. The operation will not only destroy the weeds, but will also break up the surface crust and greatly assist the potato crop.

Avoid the Necessity of Thinning Seedlings.

If seedlings are crowded it is a common experience that unless they are thinned out—in most instances to a distance of 1 in. or more apart—the plants will be weak, and the crop poor as a consequence. The rows may be thinned to clumps of plants fairly quickly and each thinned later to a single strong plant, but the costly operation may be avoided if necessary precautions are taken. The need for thinning commonly arises when fine seeds of high germinating-capacity are sown, as, for instance, lettuce, carrot, or celery. Turnips and the varieties of cabbage also commonly suffer in this respect.

The obvious remedy for this trouble and expense is to sow the seeds thinly,

especially in cases where the plants are to complete their growth where sown. Occasionally, old seed which is valuable because of its high strain has to be sown thickly to obtain a normal stand of plants, the reason being its low germination. The quality of the seed-bed has also to be taken into consideration. If it is not of the best, a slightly thicker sowing will be required to obtain the desired result. But where the seeds are fresh and good, or of a kind which retain their vitality well, such as those of the cabbage family, radish, turnip, lettuce, &c., the necessary adjustment may usually be made with confidence.

Germination Test.

In other circumstances, and especially where considerable areas are to be sown, a germination test should be made. This may be done by counting out fifty or one hundred seeds and placing them between sheets of moist blotting-paper or cotton-flannel on a plate, with another plate inverted over it to prevent rapid evaporation. Place them in a warm position, and keep them moist with tepid water. Count the seeds as they sprout, and keep a record of the rapidity of the germination and the vigour of growth. The proper adjustment of the rate of sowing not only greatly reduces the cost of growing the crop, but is a saving of seeds which, in the case of those of high strain, is often very considerable.

Vegetable Crops.

The supply of fresh green peas often ends rather abruptly in summer. This unfortunate experience can be usually avoided by making sowings at intervals. To maintain supplies over a maximum period, sowings should be made at intervals up to the end of December.

Sowings for November may include round beet and salad crops (including lettuce, very thinly, to mature where sown), and also garden swedes and New Zealand spinach in dry, warm localities. In the cooler districts nothing is gained by planting out or sowing half-hardy crops too soon. Such crops as tomatoes, pumpkins, squash, marrows, cucumbers, and melons are best started outside when there are good reasons for expecting weather which is free from frosts.

Brussels sprouts thrive best in the colder districts here. If planted now 30 in. apart and 3 ft. between rows on well-prepared, rich soil that has been allowed to consolidate, a good crop of sprouts should be obtained. An occasional dusting of derris powder during summer will protect them from the attack of most of the pests to which they are liable.

Celery seedlings are now pricked out for the main crop, and for this a cold

frame is often used. Close attention must be given to ventilation, and, while light-shading during the hottest part of the day is beneficial, it must not be overdone. That it is a moisture-loving plant should never be forgotten. Where it is desired to grow this crop on overdrained soils or in dry localities it is often best done in prepared trenches to facilitate watering. These should be prepared now to allow them to settle before planting.

The Small-fruit Section.

As the plants begin flowering, a dressing of nitrogenous manure may be applied to strawberry-beds, after which a mulch of straw should be laid, which will control weed growth, will keep the roots cool and moist, and will prevent soil and grit splashing on the berries during rain. If baled straw is not available, rushes between the rows and pine needles around the plants make a good substitute.

During the flowering and cropping period bush-fruit plants are seriously injured by anything like deep cultivation, which disturbs the roots. If the brakes have been kept well weeded during the spring little cultivation will be required during the cropping-period, and that should be of the lightest description.

Start of Cropping.

Cropping begins during November with culinary gooseberries and strawberries. The latter, being dessert fruit, should have a clean, bright, appetising appearance. When consigning the fruit to distant markets this condition can be preserved only by packing firm fruit. Juice stains from over-ripe fruit or grey mould disfigure too many packs. As pickers are required to grade and pack the fruit those unaccustomed to the work should be instructed and assisted until they have gained experience.

Land required for planting out with small fruits in the autumn should now receive attention, having chiefly in view the need thoroughly to eradicate all weeds, and especially those which may

persist. If the condition of the ground is very fair, such a crop as potatoes may be grown while the cleaning is in progress, but in more extreme cases a summer fallow may be necessary to obtain the desired object.

The Homestead Garden.

Weeds are not usually very troublesome in the closely planted shrubbery and herbaceous borders so long as new plant introductions are carefully scrutinized to see that serious weeds are not present in the ball of soil about the roots. The borders should be examined at intervals, and the weeds pulled and removed before they come into flower. Plants which have finished flowering should be given the necessary attention—for instance, aubrietias are trimmed back, and the seed-pods removed from rhododendrons, especially those inclined to lack vigour.

Half-hardy Annuals.

It is during November, when warm weather may be expected, that half-hardy annuals are planted out. In beds, or in groups in the herbaceous border, they afford an opportunity of introducing a pleasing variety. Not only annuals such as stocks, zinnias, asters, antirrhinum and calendulas, but such perennials as dahlias and chrysanthemums, which are grown as annuals, may be included in a scheme where additional colour is required.

Like most hybrids which have been selected because of the size and number of the blooms, these plants require generous soil treatment. A dressing of decayed manure and bone dust turned under and a little superphosphate well mixed in the top-soil shortly before planting will suit most of them best. Where plants are not available, seeds of half-hardy annuals may be sown where they are to flower.

—Wm. C. Hyde, Horticulturist.

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Work for the Month in the Apiary.

Swarming and Artificial Increase.

IF the weather conditions are favourable swarming should be in full swing throughout the Dominion by November. It is therefore most important that the beekeeper should note the condition of his hives in ample time to decide which colonies are to be allowed to swarm. Excessive swarming is often accepted by beginners as a proof of prosperity, but this cannot be regarded by any means as an established fact. Only strong colonies headed by young vigorous queens should be allowed to swarm, and in many cases it will be found that these colonies show little inclination to do so.

A colony of moderate dimensions which persists in making preparations for swarming should be deprived of its queen-cells at frequent intervals, and should be re-queened from better stock at the earliest opportunity. When a strong colony swarms the swarm should be hived at once into a clean box, which should be stood on its side in a cool place, covered with a sack in such a manner that the bees may pass in and out of the box easily, and then be left there until towards evening. By that time a hive should be prepared containing frames fitted with full sheets of foundation and, if necessary, a feeder. Place this on its permanent stand.

Feeding with Syrup.

Late in the afternoon the hive-body should be raised from the bottom-board and a clean sack laid on the alighting-board and surrounding earth. The bees should be dumped from the box on to the sack, when they will crawl into the hive. If honey is not coming in freely, or if bad weather supervenes, the swarm must be fed with syrup prepared from sugar and water in the proportions of one to two, so that the bees may begin comb-building at once.

Excellent combs are made from sugar syrup, and within two or three days the bees should have drawn out several combs and the queen should be busily engaged filling the cells with eggs. If possible,



Forming a nucleus.

always use foundation when hiving a swarm. The bees in a swarm are prepared for comb-building, and will simply waste a lot of wax if placed at once on drawn-out combs.

If the beekeeper has any reason to suspect the hive from which the swarm issues to be diseased, he should leave the swarm for at least three days in the box into which he has hived it in order that the bees may use up the honey they will have brought with them when they left the parent hive.

Removal of Queen-cells.

After the swarm has issued, the parent hive should be thoroughly examined so that the queen-cells may be removed. Every cell except two of the best should be taken away. Where the hive contains particularly good stock and the queen-cells are large and ripe, they may be carefully preserved and placed in nuclei for the purpose of queen-raising. Very often the best queens in the apiary are procured by this means.

When the swarm has been placed in its permanent hive the frames should be carefully covered by good mats. Neglect of this precaution even for two or three

days will often result in the bees building comb right into the roof, especially where gable-roofs are used, thereby wasting much good material as well as making the hive difficult to open.

After-swarms.

It often happens that, in spite of all precautions, strong colonies will throw an after-swarm within a few days of the issue of the prime swarm. Sometimes the prime swarm will be delayed by bad weather, in which case the bees may have kept the virgin queens in their cells until the laying-queen has left the hive, only to liberate them immediately after and before the apiarist has time to examine for queen-cells.

These queens, being small and quick-moving, are very difficult to detect, and will probably escape notice altogether. In this case the after-swarm may follow very quickly after the prime swarm. Occasionally, too, a few queen-cells may be missed in cutting out. If they are built, as frequently happens, on the edge of the comb against the side of the frame they are very easily overlooked. After a little observation an after-swarm can often be detected by its behaviour.

A laying queen is heavy with eggs, and will usually seek a resting-place without delay and without venturing too high from the ground. Sometimes, indeed, she falls to the earth, and the bees will be unable to find her and will return to the hive. She will usually alight, however, in some convenient spot, and the bees will cluster round her with amazing rapidity. When the hives are scattered instead of being in regular rows a bee-keeper working in his apiary at a distance from a swarming hive may miss the whole operation of the issuing of a prime swarm unless the noise attracts his attention, so quickly, as a rule, do the bees settle with a laying-queen.

Dealing with After-swarms.

With one or more virgin queens in a swarm matters are usually different. The queens are small and light, and will often soar to a considerable height, choosing their own time about settling. If there are two or three queens in a swarm there will probably be as many divisions in the cluster, so that instead of forming one compact heart-shaped mass the swarm may hang for a considerable time in several peaks. Care should be taken to see that every section is shaken into the box.

A simple method of dealing with after-swarms is to place an excluder between two empty hive-bodies, the lower of which rests on the ground or a bottom-board. Shake the swarm on to the excluder, and the bees will go through the holes, enabling the queens to be easily distinguished and removed. When the queens are gone, the bees will return to their parent hive, and the queens may be utilized for replacing old and failing queens. There need never be any doubt as to the advisability of taking every queen from an

after-swarm; there will inevitably be one queen left in the hive for the bees to return to.

Artificial Increase.

An artificial increase may be accomplished in several ways, but perhaps the most satisfactory is by means of nuclei and division. A nucleus is best formed of two frames of emerging brood and young bees, one frame of honey, and one containing pollen. This must be completed by a virgin queen or a ripe cell. The nuclei may be utilized throughout the season for the mating of queens for renewal, and at the end of the summer, if two or more are united, or if each one is reinforced by the addition of bees and brood from strong colonies, they may be wintered in safety, and will form good stocks for the next season. No surplus can be expected from them in the year of their installation.

Dividing the Hive.

In dividing it is best to wait until the colony is preparing to swarm and ripe queen-cells appear in the hive. The hive can then simply be split in two by putting half the bees and brood on another stand, taking care to leave queen-cells in each division, and, for preference, putting as much emerging brood in the half which is to be placed in a new position. This latter precaution is necessary in order to make up the wastage from the field-bees that will return to the old stand. Each hive can then be completed by filling the vacancies by drawn-out combs.

The queen-cells in the queenless half will be nursed by the young bees, while those in the half containing the queen will be torn down by the bees when they find the hive depleted. If the apiarist wishes to be quite sure of this being done

he may search for the queen and remove her while the division is being made, afterwards putting her in the hive on the new stand. The division method is advocated because of its simplicity and the fact that there is no necessity for finding the queen before the operation. It is a most effectual preventive of swarming, and saves a great deal of trouble where increase is desired.

Supering.

In most districts November is early enough for the employment of supers, although much depends on weather conditions. If the weather is warm, the hives full of bees, and nectar coming in freely, the supers may be added at any time. However, it is of no use discouraging the bees by giving additional space before the weather is warm enough to justify it. If increase is required it is well to confine the bees to one story until the hive is overflowing with bees. This is almost certain to produce a desire to swarm, and the hive can either be allowed to swarm naturally or be divided artificially.

When the first super is put on it is best, if possible, to fill it entirely or partially with drawn-out combs. If only foundation is available, one or two combs which do not contain brood may be removed from the bottom story to the top and sheets of foundation put in their place. On no account disturb the brood until settled weather eventuates.

If foundation is used in the super, queen-excluders should not be used, as the bees will rarely travel through the excluders to work the foundation, and will usually swarm. Do not bring excluders into use until the bees are quite accustomed to working in the supers.

—E. A. Earp, Senior Apiary
Instructor, Wellington.

Lemon-tree Disease.

E. H. M. (Otū, Wanganui River), writes: I have three or four lemon-trees growing in my garden at the above address, and one of them, which I think is either a Lisbon or a Eureka tree, has been attacked the last two winters by some sort of disease which attacks the fruit just about when they are changing colour. It appears to attack the skin first, changing the colour to a dullish grey, and then penetrates the fruit, which turns dark and then decays. Also, the leaves appear to be attacked at the same

time (by some fungus apparently), the trouble commencing at the tip, which turns black before the leaf drops off.

In reply, the Horticulture Division states that correct diagnosis of the trouble is best made from specimens supplied, but from the description given it appears the damage is due to citrus brown-rot fungus (*Pythiacystis citrophthora*), a disease which is prevalent wherever the lemon is cultivated. The fungus is normally a soil one, living on decaying vegetable matter, and flourishes only when excess moisture is present.

Control consists in removing branches in contact with the ground and maintaining a clean, dry fallow beneath the trees or, most suitable for the winter period, a cover-crop of herbaceous growth which prevents the upward carriage of spores by rain splashes.

In addition, it is customary during the autumn to apply thoroughly a Bordeaux mixture 3-4-50 strength, and repeat it at intervals of a month as may be necessary.

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Poultry-keeping Section.

General Hints for the Poultry-keeper.

IF the best results are to be obtained from the young stock, all chickens should be hatched out by the end of this month at the latest.

As soon as the required number of eggs for hatching purposes have been gathered it is sound economy to dispose of all spare breeding-males, for the hens will lay just

vitality—such a bird should be given special attention and retained as long as it will give good fertility. This point is stressed, because some poultry-farmers sell all breeding-males as soon as the breeding season is over, and rear a fresh lot of cockerels to head their breeding-pens each year.

While it is quite true that well-developed cockerels will give the best fertility, especially early in the season, it is well to remember that the proved prepotent male of high quality is rare and is a very valuable asset. The fortunate poultry-keeper who possesses such a bird should retain him, and see that he heads a special pen for breeding cockerels for future use.

Broody Hens.

Broody hens are likely to be troublesome from now on. It is natural for hens of the heavy breeds to go broody, and some Leghorns are at times troublesome that way, but the latter should be marked and never used as breeders. At times, some heavy-breed pullets will lay more than 100 eggs before going broody, but older birds of the same breed usually go broody after laying a smaller number.

As soon as a hen shows signs of wanting to sit on the nest late in the afternoon or at night she should be removed to the broody coop, for broodiness is a fever, and the longer hens are allowed to sit on the nests the longer they will be in coming back to lay.

A broody coop is a very necessary part of the equipment of a poultry plant. It will be found a great convenience for breaking up broody hens. A broody coop should be in each laying-house. It is a good practice to hang them on the wall, where they will be easily accessible, so that confined birds are more likely to get regular attention. The floor of broody coops should be of slats or wire-netting. Never neglect broody hens, for if they are not watered and fed regularly they soon lose condition and take much longer to come back to lay.

A hen which goes broody too often is of little use as a profit-maker, and for this reason such birds should be marked each time they go broody, so that when the time comes for selecting breeders those that have gone broody too often will be discarded. It is a good plan to go around the fowlhouses each evening just before dark and remove any hens on



Fig. 1.—The wrong way to carry a fowl—by the legs with the head hanging down.

as well without the males, and eggs will keep much better when they are infertile.

On many general farms it is not uncommon to see quite a number of more or less useless males kept the whole year—in fact, many birds are kept long past the age of usefulness. Such birds merely increase the cost of production, for, as indicated, male birds are useful only when chickens are required.

Retain Special Birds.

It is a sound practice to dispose of all surplus birds as soon as their period of usefulness is over, but if the poultry-keeper has an outstanding male—one that has given good results, has stood up to his work well, and is full of vigour and



Fig. 2.—The correct way to carry a bird—with the head toward and the tail away from the holder.

the nests to the broody coops. If this is done, many birds will soon be laying again.

Preserving Eggs.

The uneven seasonal production of eggs results in a surplus during the spring months and a scarcity during the autumn and winter, and it is therefore sound economy to preserve eggs during the flush season for use during the time of scarcity.

Eggs laid at this time of the year are generally of better quality and preserve better than those laid during the summer, and for these reasons those who intend preserving would be wise to do so before the weather gets too warm. Eggs intended for putting down should be tested and only the best quality preserved. Cracked or dirty eggs should not be preserved.

It is advisable to allow the animal heat to get out of the eggs before placing them in the preservative. A solution of water-glass (silicate of soda) is a very popular and satisfactory preservative.

The water-glass should be diluted just enough to allow the eggs to sink. Soft water should be used, but if spring water has to be used it should be boiled. Eggs may be added from time to time until the vessel is full, but at least 1 in. of the solution should cover the top layer of eggs.

There are several useful mixtures and brands of preservatives on the market, and the manufacturers give full instructions in regard to their use.

Sanitation.

At this time of the year many poultry-farmers are feeling the strain of long working-hours and the many worries that are inevitable with a busy hatching and rearing season. With some there is a tendency to slacken a little in essential details of management.

Even the most experienced poultry-farmers find the later chickens the most difficult to rear successfully. Everything should be done to guard against disease, and the best way to assist in this direction is to pay extra attention to the principles of sanitation. The litter under the brooder should be renewed as often as necessary. Nothing is more likely to cause trouble than dirty or damp sleeping-quarters, and a few extra bags of bedding-material are much less expensive than the loss of good pullets.

Feed-troughs and drinking-vessels need a thorough cleaning each day, and, if possible, feed-hoppers should be so arranged that the stock cannot foul the feed.

Should any trouble be noticed with the chickens, it is well to destroy and burn immediately those badly affected. Make sure that a clean, dry bed and plenty of fresh air is provided at night and that there is no overcrowding. It is not unusual to see dead chickens carried in

feed-buckets. This is a mistake, for disease is likely to be passed on in this manner.

If trouble is experienced and the nature and cause is not understood, it is advisable to send an affected specimen to the Officer in Charge, Veterinary Laboratory, Wallaceville. An examination will be made and a report sent, with suggestions regarding prevention and treatment. There is no charge for the examination and report, but the poultry-keeper is expected to pay freight on specimens sent.

Regular Supply of Green Food.

A fowl's natural tonic is green food, and it is estimated that one-third of what a fowl eats when on free range consists of green food. Autumn colds and infectious catarrh in pullets have been proved to be caused in many cases by a lack of succulent green food during the growing stages. Loss of appetite, retarded growth, and nervous disorders can often be avoided by a liberal and regular supply of succulent green food. For these reasons it is very important to see that provision is made for a regular supply of green food. Especially is this so where poultry are kept on the intensive system.

How to Hold and Carry Fowls.

Many birds, especially when in full lay, are injured by being carried in the wrong way.

Figure 1 shows a hen carried in the wrong way—by the legs, with the head hanging down. This is often the cause of injury or unnecessary suffering, and if the crop happens to contain water it will run out through the gullet and may partly strangle the bird.

Figure 2 shows the correct way—with the head toward and the tail away from

the holder. Make the bird as comfortable as possible. The thighs are held in the hand with one finger in between them, thus avoiding too much pressure on the bones. The breast-bone should rest on the forearm. By being held in this way the bird suffers little inconvenience, and the holder is not likely to get his clothes soiled.

Chick-sexing Examination.

A chick-sexing examination was conducted by the Department at the Wallaceville Poultry Station on 26th August. Three candidates presented themselves for examination, one for a first-class and two for a second-class certificate. Mr. R. Fairey, Emerson Street, Napier, who sexed one hundred chickens in 19 minutes 30 seconds, with an accuracy of 93 per cent., qualified for a second-class certificate. The other two candidates failed to qualify.

—C. J. C. Cussen, Chief Poultry Instructor, Wellington.



Chilled Eggs (Marketing) Regulations, Amendment No. 1.

THE Chilled Eggs (Marketing) Regulations 1935, Amendment No. 1, enacted under the authority of the Poultry Act, 1924, amend the principal regulations by requiring that all eggs intended for deposit in a cool store for chilling purposes must be packed in clean, odourless packages or containers fitted with clean, odourless standard fillers and flats or standard filler-flats, and, further, that all eggs, whether deposited for chilling by a baker or pastrycook for the purposes of his business or by any other person, must be stamped with the word "chilled."

DEPARTMENT OF AGRICULTURE.

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N.Z. Federation of Young Farmers' Clubs.



Edited by S. Freeman, Dominion Organizing Secretary.

President's Message to Young Farmers.

I WISH to congratulate all associated with the Y.F.C. organization on the rapid strides that have been made since the inauguration of the federation four years ago. At the same time, I consider that a "stock-taking" is necessary to ascertain whether members and clubs are obtaining the utmost value from their organization. It must not be lost sight of that the Y.F.C. movement is primarily to educate the young farmer, to fit him for his own job, and to enable him to appreciate the many advantages of rural life, thereby rendering him of more value to the community.

I would advise clubs and members who feel that they are not getting the best out of the movement to endeavour to arrange through their district secretary for the organizing secretary to attend one of their meetings with a view to assisting them to devise some means of establishing their club on a better basis.

Attendance at Meetings.

Clubs should make every effort to ensure that their delegates attend all district committee meetings, at which they will come in contact with members of other clubs, and also with the district secretary (the local Instructor in Agriculture), who will be able to render them valuable service. The regular attendance of district committee delegates at council meetings is also important, and will provide another link in the chain.

Regarding the *Journal of Agriculture*, which is now your official organ, I feel sure that the Department's offer of direct postage to all members at the concession rate will be appreciated. I would urge clubs to take full advantage of the Y.F.C. section in the *Journal*. Club secretaries



Mr. Alan Grant.

can do their part by forwarding regular reports through the proper channels, and members can assist by sending in articles and photographs for publication. Interest might also be created by sending in questions for other members to answer.

Encouraging Younger Members.

In regard to the raising of the age-limit to thirty years, only time can tell whether or not this is a wise move. It is to be hoped that older members will do all within their power to encourage younger members to take a full interest in all club activities, and that, where practicable, they will give them preference for the officers of club chairman, secretary, &c.

We in this Dominion are fortunate in possessing the finest agricultural and pastoral country in the world, and, in my opinion, the opportunities for young farmers are greater than ever before.

The Y.F.C. movement will enable them to grasp their opportunities, and will assist them to become "better farmers and better citizens." It is their own organization, and the more they put into it the more they will get out of it.

I sincerely wish the clubs and members another year of progress.

(Signed) ALAN GRANT,
President, Waimate.

President's Career.

Mr. Grant was born on a farm in Morayshire, Scotland. Educated at Forres Academy and Aberdeen Agricultural College, he took a diploma in agriculture at Aberdeen University, and was prizewinner in agriculture and medallist in stock-judging in 1908.

He came to New Zealand in 1913, and was for three years in the Department of Agriculture. Later, he farmed in both the North and South Islands, and went to Canterbury in 1918, since when he has been breeding stud Romney and South-down sheep.

Mr. Grant is chairman of the Waimate Hospital Board, of which he has been a member for ten years. He has been connected with the wheat-marketing schemes since 1930, and is at present a member of the Wheat Committee. He is also a member of the Agricultural Committee of the Department of Scientific and Industrial Research, and is a member of the Plant Research Bureau. He has been associated with the Y.F.C. movement since the formation of the federation, and is chairman of South Canterbury District Committee and chairman of the Canterbury Council of the New Zealand Federation.



Educational Week in Dunedin.

S. R. WHYTE, Hon. Secretary, Otago-Southland Council

FOR the sixth year in succession a very successful Young Farmers' Educational Course was organized at Dunedin during the week commencing 1st August. During the past five years Mr. A. C. Cameron has personally organized these courses, and they have been an outstanding success.

This year the course was organized as an activity of the newly-formed Otago and Southland Council, but the executive of that body asked Mr. Cameron if he would undertake the organizing work on similar lines to previously, and this he willingly undertook to do.

No fewer than 103 lads, representative of nearly every district in Otago and Southland, attended the course. Of this number, 45 were from various Young Farmers' Clubs in Otago and Southland, and 58 were from districts where there are at present no young farmers' clubs. The programme was a varied one and was followed with the greatest interest throughout.

During the week the following addresses were delivered: "Citizenship," Dean Cruickshank; "War and the Poets," Mr. H. P. Kidson, M.A., B.Sc.; "International Affairs," Mr. J. T. Paul; "The Young Farmers' Club Movement," Mr. J. M. Smith (Field Superintendent, Department of Agriculture), and Mr. A. C. Cameron.

Visits to Institutions.

A visit was paid to the Otago Medical School, where the Dean of the Medical Faculty, Professor C. E. Hercus, gave an illustrated lecture on "Physical Education." Another visit was paid to the Chemistry Department of the University of Otago, where Professor F. G. Soper gave a lecture and demonstrations on "Some Relations of Chemistry to Agriculture." An afternoon was spent at the Dunedin Public Hospital, where the young farmers were conducted through the various departments and given an idea of the working of a large metropolitan hospital. A morning was spent at the Dunedin Technical School, where Dr. Vernon Griffiths gave a talk on "Music," with demonstrations by the school choir, band, and orchestra. Visits were paid also to the University of Otago Museum, where the curator, Mr. H. D. Skinner, M.A., gave a talk upon the Maori exhibits, and to St. Paul's Cathedral, where Dean Cruickshank gave a talk upon the fine interior Gothic architecture.

During the week the party visited Waipori Falls hydro-electric power-station



Members attending the Educational Week in Dunedin. Mr. A. C. Cameron is fourth from the right in the front row.

as the guests of the Dunedin City Corporation, which supplied a most enjoyable luncheon at the falls. Visits were paid to Messrs. Cadbury, Fry, Hudson's works, to Ross and Glendining Roslyn woollen-mills, the *Evening Star* printing office, to 4YA Broadcasting Station, and to the Otago Early Settlers' Museum.

Entertained at Dinner.

The party was entertained one evening at dinner as the guests of the Dunedin Junior Chamber of Commerce, and to the theatre as the guests of the Otago Provincial Council, New Zealand Farmers' Union.

During the week, morning and afternoon teas were supplied by the Otago Farmers' Union Mutual Fire Insurance Association.

The continued success of these educational weeks lies in the fact that each year different lads attend the course, and very close co-operation exists between the branches of the Farmers' Union, Women's Division, and Young Farmers' Clubs, all of which assist in the selection of the representatives from the particular district concerned. Undoubtedly much of the success is due to the personal work done by Mr. A. C. Cameron.

Manawatu Debating Contest.

G. S. ROBINSON, District Secretary.

FOLLOWING somewhat similar lines to the debating competition recently arranged by the Bay of Plenty Young Farmers, a competition in the Manawatu is now in progress. A valuable Challenge Shield has been presented by Mr. W. J. Viles, of Apiti.

Earlier in the season clubs held elimination contests, at which their club teams were picked. These consist of three members, the leader being allowed ten minutes for speaking and five minutes for summing up, while the other speakers are allowed five minutes each.

The first round has just concluded, the subject being "That Farming To-day is More Difficult than it was Fifty Years Ago." All contests were closely fought out, and the winning teams now left to

compete in the second round are Otaki - Te Horo, Levin, Rongotea, Fitzherbert, Colyton, Pohangina, Kimbolton, KIWITEA, and Apiti. The subject for this round will be "That the Embargo on the Direct Importation of Live-stock because of Foot-and-mouth Disease should be Lifted."

The following is the draw for this round: Otaki (affirmative) v. Levin (negative), at Levin; Fitzherbert (affirmative) v. Rongotea (negative), at Rongotea; Kimbolton (affirmative) v. Apiti (negative), at Apiti; Colyton (affirmative) v. Pohangina (negative), at Pohangina.

It is hoped to hold the final contest in the Opera House at Palmerston North towards the end of September.



Tour of the North Island by North Canterbury Young Farmers.

L. W. BLACKMORE, District Secretary, Christchurch.



Fig. 1.—The Canterbury young farmers' touring party photographed at the top of Pukeora Sanatorium Hill, Waipukurau, Hawke's Bay.

[J. W. Palmer, photo.]

IT was with a feeling of adventure and pride in being the first South Island Young Farmers' Club party to make a tour of the North Island that the North Canterbury party set off on 11th July on its comprehensive tour, which involved sixteen days and a distance of nearly 1,400 miles.

On arrival at Wellington the party was met by Mr. S. Freeman, the Organizing Secretary, and, after breakfasting, departed for Palmerston North in the three twenty-seater buses which had been engaged for the tour. After lunch Mr. G. S. Robinson, Department of Agriculture, Palmerston North, conducted the party to the Plant Research Bureau, where Mr. L. Gorman described the nature of the plant breeding and selection work being carried out there. Great interest was shown in the 80-acre rotational grazing experimental sheep-farm under the supervision of Mr. A. W. Hudson, of Massey Agricultural College, members of the party being greatly impressed with the increased carrying-capacity which had resulted since the new system of management had been adopted.

Reunion Dinner.

A very entertaining two hours' was spent at the Manawatu Young Farmers' Club touring party's reunion dinner. Later that evening at Massey College a welcome was extended by the Director, Professor G. S. Peren, after which the

Director of the Fields Division, Mr. R. B. Tennent, in an address on the Young Farmers' Club movement, pointed out that the future of the movement was in the hands of the young farmers of to-day. Mr. Tennent laid particular stress on the need for young farmers realizing their responsibility, and urged those present to take a greater part in the organization of their own activities.

The following morning a visit was made to the main fat-lamb areas of the Manawatu, calling at Mr. F. Tanner's property, "Karere." At Mount Stewart, on the way to Hawera, the party was met by members of the Wanganui district clubs, and Mr. C. J. Hamblyn, Department of Agriculture, briefly outlined the lay-out of the surrounding country, its soil types, and the kind of farming engaged in. On the journey to Hawera visits were made to Ellis Bros' Southdown stud and to Mr. Phillips' farm at Marton. The latter farm has wintered a thousand ewes on a hundred acres for several years. That night we were the guests of the Hawera Harmonic Society at their choir concert.

Unique Honour.

A unique honour was conferred upon the party the following morning when we were welcomed at the historic Turuturu-Mokai Redoubt, for it was the first occasion on which a welcome was given at this ancient battleground by members of the

Maori race. For three centuries this area had been declared tapu, but by a special Maori ceremony performed a few days previously by members of the South Taranaki tribes the dreaded tapu had been removed for all time.

The party was also welcomed by the Mayor of Hawera, Mr. J. E. Campbell, and Mr. John Hewston, the well-known authority on South Taranaki Maori affairs, gave an address on the historical aspect of the pa, explaining the points of construction and the Maori tactics in war. He also referred to the social and economic problems of the Maori to-day.

Our visit to the Waimate West Demonstration Farm, where Mr. J. E. Davies outlined the work in hand and members of the Farm Committee explained various points of management, was of great interest.

From Inglewood the party was conducted to Mr. J. N. Blyde's high-producing dairy-farm at Lepperton, where we were met by members of the North Taranaki clubs.

Longest Journey.

From New Plymouth the party set out on its 160-mile trip to Hamilton, the longest journey of the tour. Met at Mahoenui by Mr. K. M. Montgomery, Department of Agriculture, we were taken to Mr. L. Purdie's farm in the heart of the King-country, where a demonstration was given on some of his stud Aberdeen Angus cattle. In discussing his farm

Mr. Purdie placed particular emphasis on stocking heavily with cattle, and said that in country such as his, which is likely to revert to scrub rapidly if neglected, cattle were an absolute necessity for successful grassland management. Late that afternoon the Te Kuiti lime-works, which are the largest in New Zealand, with a capacity of 400 tons of lime daily, were visited, and a visit was also paid to the Waitomo Caves.

The following morning at Ruakura Experimental Farm Mr. T. E. Rhodda and Mr. C. E. Ballinger outlined the nature of the work being carried out. The former confined his remarks chiefly to pastures, and the latter spoke on pigs and cattle.

On the way to Rotorua a visit was made to the Arapuni hydro-electric scheme, where we were met by Mr. C. S. Dalgleish, Department of Agriculture, and members of the Putaruru Club. A most interesting day was spent in the Rotorua District, where the party made a trip to the thermal sights at Orakei-Korako, and on the way travelled through the Perpetual Forests Afforestation areas, covering a total of 176,000 acres, and the Native Development Scheme at Horohoro. Mr. Dalgleish, who accompanied the party, explained the methods that had been adopted in developing this class of pumice land. It was explained that the main factors bringing success were proper consolidation of the soil, the sowing of certified grasses and clovers, and the application of liberal quantities of superphosphate. Apparently the soil, on the whole, was not deficient in lime.

Visit to Thermal Sights.

Before leaving Rotorua next day the party visited the sights at Whaka and the lakes Rotorua, Rotoiti, and Rotoma. The party was met by Mr. C. R. Taylor, Department of Agriculture, and, after passing through the cinder-like Tarawera shower area, where further land-development work had been done, a welcome was given by members of the local club at Edgecumbe. That afternoon an inspection was made of the Rangitaiki Dairy Factory and the well-known piggery which, although two miles away from the factory, is supplied with buttermilk by pipe-line. About two thousand baconers and between three hundred and four hundred porkers have been sold off the farm during the last twelve months. On the way to Opotiki that afternoon a visit was made to the Whakatane Paper Mills, which are now nearing completion.

After a stiff and somewhat uninteresting climb over the Raukumana Range we were met by Mr. E. M. Bates, Department of Agriculture, and members of the Te Karaka Club. *En route* to Gisborne a demonstration was given at Waihohe Hereford stud, and an inspection was made of Mr. G. Brown's farm near Te Karaka.

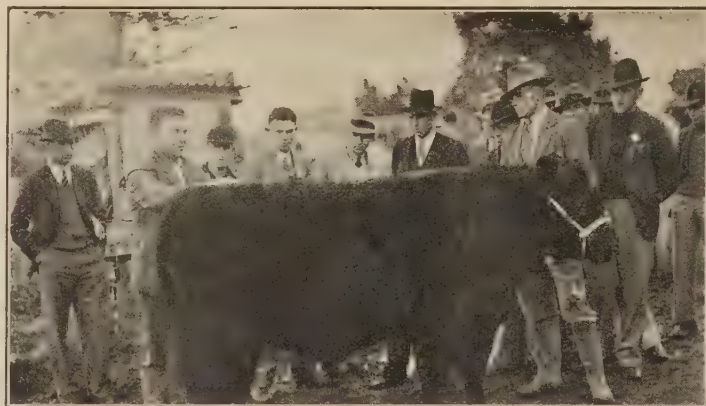


Fig. 2.—Mr. D. G. Grant demonstrating the points of Aberdeen Angus on one of his stud bulls at his property at Mangatoto, Dannevirke, to members of the Canterbury young farmers' touring party and also members of the Dannevirke Club.

[J. W. Palmer, photo.]

A full day's entertainment was arranged by members of the Gisborne Club. The party was welcomed at Mr. C. Tietjen's farm in the morning, when Mr. Tietjen and Mr. Graham, president of the local A. and P. Association, outlined the type of farming carried out in the district, and instanced a number of cases in which the carrying-capacity had been particularly high. That afternoon Mr. Smith's farm was visited, and an inspection made of the areas silted by floods during the year. Because of heavy rain that night and the next day we decided to remain the day at Gisborne, which, unfortunately, meant that the programme prepared by the Nuhaka and Wairoa Clubs had to be cancelled.

Land-development Area Visited.

On our way to Napier the following day we were met by Mr. R. P. Hill, Department of Agriculture, and visited the 27,000-acre Government land-development area at Kotemaori. The manager, Mr. Monteith, pointed out that this land had originally been sown down in grass, but had gradually gone back and scrub had taken possession. In relating the methods adopted in the regressing of these areas he stressed the part that had been played by subterranean clover and top-dressing. The devastating effects wrought by the recent heavy rains on the country between the Mohaka River and Napier was astounding, and anything from 10 per cent. and up to 50 per cent. in certain parts of the surface of the hillsides in this area was scarred by slips. Because of the delay at Gisborne we were not able to visit the Esk Valley.

At Hastings we were met by Mr. J. W. Palmer, Department of Agriculture, who accompanied the party as far as Dannevirke. In the morning a visit was paid to the property of Mr. A. F. Symes, Longlands, where demonstrations were given on Southdown stud ewes, Polled Angus cattle, and a recently imported

blood sire. Mr. D. Grant's farm was also visited, and great interest was taken in his Polled Angus cattle. Mr. Palmer gave a description of the types of farming carried out in the various parts of the district. That evening members attended a very successful dance organized by the Dannevirke Club in their honour.

In the Wairarapa.

After leaving Dannevirke the party was shown over the farms of Mrs. Cornelius and Mrs. C. Walker, of Pahiatua, and met members of the Ballance Club, being entertained at morning tea and lunch. The property of Mr. T. Ross was also visited. Although his farm is only 100 acres in area, Mr. Ross sends between 1,200 and 1,600 fat sheep off the property annually.

At Masterton on the following morning the stud Romney sheep on Sir William Perry's farm were inspected. Members were particularly impressed with the high quality and evenness of his ewes. At Masterton the party was welcomed by the Mayor, Mr. Jordan, and after lunch a visit was made to Mr. J. Donald's stud Ayrshire farm at Featherston.

On the last day in the North Island a most interesting morning was spent at Wallaceville Laboratory, where Dr. G. S. Moir outlined the history of the institution and referred to the work being carried out in connection with stock diseases. A thorough inspection was then made of the rooms in which the research work is being carried out, the work being described by the staff. In the afternoon the party split up into two groups, one going to Ford Motor Assembly Works and the other to Parliament Buildings.

The party left Wellington by steamer that night, 25th July, and so ended a very enjoyable and memorable tour. The tour was a great success, but it would not have been possible without the co-operation and hospitality so freely given at all stages of the journey.



The Necessity for Leadership.

VALUABLE advice, based on experience, was tendered to the annual meeting of the Federation of Young Farmers' Clubs by Mr. A. C. Cameron, who, as Dominion Vice-President, presided over the conference in the absence of the President, Mr. W. F. McLaren. Mr. Cameron is one of the founders of the movement, and has played a big part in bringing it up to its present strength.

"Although we may get valuable suggestions from the experience of the Young Farmers' Club movement in other countries, I believe that in the main we must work out a technique of our own," stated Mr. Cameron. "For one thing, our ages for club membership differ from those of Australia, America, and England, and whereas in those countries the emphasis is given to such things as calf-rearing, small-plot development, and stock-judging competitions, we in New Zealand give the emphasis to general farming practice.

Proud of Progress Made.

"We have reason to be proud of the progress made, but I do not think that any of those who are actively working for the furtherance of the Young Farmers' Club movement in New Zealand can afford to be complacent about it.

"As in the case of every new movement, and particularly youth movements, we must expect a continual evolutionary process, and we will be very fortunate indeed if at times we do not get a revolutionary one.

"My experience with the working of Young Farmers' Clubs during the past nine or ten years leads me to make the following generalizations.

A Real Problem.

"It will be a real problem to maintain interest where clubs are established in sparsely settled districts. Such clubs may do well where they have chairmen and secretaries with personality and initiative, but will languish when young men without these qualities hold office. It is inevitable that some clubs will need more spoon-feeding than others.

"The standard, of what for want of a better name, I will call 'loyalty to the club' varies in different localities. It is an unfortunate fact that some districts cannot be sure of a decent attendance of members even for a prominent visitor, and this is most disheartening for those who have made the arrangements.

"Some club secretaries are very careless, and we frequently hear of members



Mr. A. C. Cameron.

failing to get notices of meetings. Some clubs have to run dances and sports fixtures at frequent intervals in order to keep members together.

Leadership Lacking.

"In many districts there is little indication shown of any ability on the part of the young fellows themselves to organize their own functions thoroughly. In other words, essential qualities of leadership are sadly lacking. This is a very real problem for executive members of the movement, but it is one which I am convinced can and will be overcome.

"I want to make it quite clear that this generalization does not apply to all districts. I could name many districts where young fellows with leadership qualities appear to be plentiful, and where some are outstanding, and where there appears to be no dearth of capable material coming on.

"Generally speaking, this position applies in the more prosperous closely settled areas where the majority of the club members have had the advantage of secondary education. The capable organization of the 'Cavalcade of Agriculture' at the last Palmerston North Show is an illustration of what can be done by young farmers who possess leadership ability.

Athenian Oath.

"It should be our aim to encourage our young farmers to help themselves—to learn to lean upon themselves—to provide their own driving force. At a certain stage in their lives the youth of ancient Athens had to take an oath before they were allowed to take part in the

activities common to the youth of those times. Let me quote a portion of that oath:—

"I will not disgrace the name of my city. . . . I will hand on my city, not only not less, but greater and better than I found it."

"If the young farmers of New Zealand would apply the spirit of this oath to their own district and to the Young Farmers' Club in their particular district, then assuredly we should have nothing to fear."



National Sheep-shearing Competition.

G. S. ROBINSON, District Secretary, Manawatu.

FOLLOWING the National Young Farmers' Club's Stock-judging Competitions held at the Manawatu Agricultural and Pastoral Association's Spring Show in 1937, the Manawatu Young Farmers' Clubs have gained the honour of arranging for a Young Farmers' Club National Shearing Competition to be held on Saturday, 5th November, in the Motor Olympia Hall at the Manawatu Agricultural and Pastoral Association's Spring Show. At this competition will be found the New Zealand Champion Young Farmers' Club shearer.

The prize-money which the Agricultural and Pastoral Association is offering is £60, and this should be an attraction to all eligible shearers. The competition is to be divided into three classes according to the ability and experience of the competitors. There is a learners' class for shearers who cannot shear more than 100 sheep a day, an intermediate section for those between 100 and 150, and a senior section for those who can shear more than 150:

Prizes are divided as follows:—

I. Learners' Class—First, £2; and eight prizes of £1 each. II. Intermediate Class—First, £12; second, £5; third, £2. III. Senior Class—First and New Zealand Championship, 20 guineas; second, £7; third, £3.

One of the big features of the competition is that it will provide excellent entertainment for the spectators, and seating accommodation for more than one thousand will be arranged. There will be ten stands of electric motors, and ten competitors will start together at the gong. Time will be taken over two sheep, and the judges will take this into consideration, together with the style and neatness of the shearer, in making their awards. Four-tooth wethers will be used for the competition.



Survey of Clubs in the Wellington Area.

F. E. SHERWOOD, Hon. Secretary, Wellington Council.

A SURVEY of the Young Farmers' Club movement in the Wellington Council area discloses some interesting figures. At the time of writing (18th August, 1938) the following statistics are available:—

District.	Number of Clubs.	Total Membership.	District Committee Formed.
N. Taranaki ..	5	103	12th Aug., 1938.
S. Taranaki ..	9	134	27th May, 1937.
Wanganui ..	6	214	30th May, 1938.
Manawatu ..	20	630	30th Oct., 1936.
Wairarapa ..	11	294	19th Sept., 1935.
Southern H.B.	4	157	19th Aug., 1938.
Northern H.B.	3	170	14th Aug., 1938.
Poverty Bay	4	134	29th May, 1937.

(The location of the clubs and the district boundaries will be seen by a perusal of the accompanying map.)

The total membership of the area is 1,836, which is distributed among 62 clubs in eight districts, and district committees have been formed in each district.

While the number of clubs in the area is considerably greater than the number in any other Council territory, and the membership is more than a third of the Dominion total, it can hardly be said that the area is fully covered by this remarkable young man's movement. A perusal of rural population statistics discloses the fact that a very small percentage of possible members have actually joined the Young Farmers' Club organization. In the Wellington Council area there are upwards of ten thousand young men between the ages of fourteen to twenty-five resident in country districts—that is, rural areas outside of cities, boroughs, and town districts.

It is estimated that a full coverage of the Council's territory would mean about 120 clubs, or twice as many as are actually operating at the present time. However, the remarkable popularity of the Young Farmers' Club movement, combined with the enthusiastic and enterprising efforts of district committees, district secretaries, and clubs, should, with the co-operation of club members themselves, attract a large proportion of present non-members to this fine organization.

Among the clubs the enthusiastic Wairoa Club has the largest membership in the area with 110 members. It is probably the largest club in the Dominion. Other large clubs are Masterton, with



94 members, and Dannevirke, with 70 members. The oldest club in the Wellington Council area is the Levin Club, founded on 27th August, 1934. It was the first club formed in the North Island, although the Ballance Club (founded on 24th September, 1934) was the first actually to affiliate with the New Zealand Federation.

Y.F.C. Radio Broadcasts from 2YA.

THE following is the programme of Y.F.C. lectures to be broadcast from Station 2YA, Wellington, during November:—

Tuesday, 1st November—"Lucerne": Messrs. W. Moffatt and W. Jarvis, Oroua Y.F.C., and Mr. A. J. Galpin, Department of Agriculture.

Tuesday, 15th November—"Fat Lamb Selection": Members of the Bulls Y.F.C.

Tuesday, 29th November—"Preparation of the Seed-bed for the Sowing of Grass Seed": Messrs. A. J. Galpin, Department of Agriculture, and G. S. Robinson, Manawatu District Secretary.

The Y.F.C. session at Station 2YA, Wellington, is from 7.40 p.m. to 8 p.m. every Tuesday fortnight.



Football Match at Blenheim.

A football match was held at Blenheim recently between representatives of the Blenheim and Seddon clubs.

There were a few regular footballers on either side, and for the most part the players were rather out of training, with

the result that in the second spell the play was slowed up.

Fast breakaways by Blenheim broke up most of the Seddon attacks before much ground was gained, and the Blenheim backs showed more combination, with the result that they were

given the ball at every opportunity. The final score was Blenheim 16, Seddon 3. Blenheim scored four tries, two of which were converted, and Seddon scored one unconverted try. The Seddon team hope to retrieve their laurels in a return match at an early date.



The Blenheim Club's Team.



The Seddon Club's Team.

Among the Clubs: Reports on Activities.

Western Southland.

Dipton.—Address by Mr. E. S. W. Thomas, Invercargill, on "Farm Insurance."

Thornbury.—Members gave reports as follows: O. Fallow (annual meeting of the Federation), J. Mitchell (Dunedin Education Week), K. McKenzie and J. Beggs (field-day at Makarewa). A short discussion on "Lambing" was also held.

Woodlands.—Arrangements were finalized for a debate with the Lochiel Club. Mr. W. A. Pickford, Government Tourist and Publicity Department, exhibited a series of films depicting New Zealand's beauty spots and tourist resorts.

Wyndham.—Lecture by Mr. J. Danskin, Government Veterinarian, on "Diseases of Animals." At the previous meeting Mr. P. Campbell gave a lecture on "The Sheep Industry of New Zealand."

Combined Field-day.

A combined field-day was held by the Western Southland clubs at Makarewa on 30th August. Nearly one hundred members, representative of the Dipton, Lochiel, Thornbury, Woodlands, and Wyndham Clubs were assembled. Demonstrations and talks were given as follows: "Stock Ailments" (Mr. G. Brash, B.V.Sc.), "Sheep-dogs" (Mr. J. Nelson), "Lambing" (Mr. J. Lillico), "Clydesdales" (Mr. J. Ewan), "Ploughing" (Mr. C. Gray), "Romneys" (Mr. W. A. Roxburgh), "Southdowns" (Mr. W. Falconer), "Dorset Horns" (Mr. A. C. Gray), "The Freezing Industry" (Mr. A. Derby). Stock-judging competitions were held, resulting as follows—Romneys: J. F. Beggs (Thornbury), 1; L. McKenzie (Woodlands), 2. Southdowns: C. Stewart (Wyndham), 1; J. I. Lindsay (Drummond), 2.

Eastern Southland.

Crookston.—Address on "Farm Book-keeping" by Mr. R. J. Sim, Heriot.

Otama.—Report by club members, W. White, L. Mackay, and T. Logan, on the Dunedin Educational Week.

South Otago.

Lawrence.—Club debate, "That Agricultural Farming is more profitable than Pastoral Farming." The side supporting pastoral farming were adjudged the winners by 207 points to 176.

Milton.—Lantern lecture by Mr. F. L. Nicholson on his tour to England.

Stirling.—Address by the Rev. A. Millar on "Chinese Farm Agriculture."

Central Otago.

Arrourtown.—Discussion regarding the Y.F.C. Sheep-shearing Competitions. Talk by Mr. W. H. Thompson, an advisory member, on "The Winter Feeding of Stock in the North of Ireland."

Roxburgh.—Lantern lecture by Mr. H. Doyle, Government Veterinarian, on "Tuberculosis in Cattle."

Upper Clutha.—Lantern lecture by Mr. J. M. Smith, Department of Agriculture, on "Comparisons between North and South Island Farming." At the previous meeting a lecture was given by Mr. C. V. Dayas, M.R.C.V.S., on "The Management of Breeding-ewes."

Dunedin.

Palmerston South.—Dr. Thomas gave an instructive address on "First Aid to the Injured," explaining what to do in cases of strains, broken ribs, dislocated hips and shoulders, broken bones, hemorrhages, foreign bodies in the eye, &c. He also gave a practical demonstration of artificial respiration.

West Taieri.—Lecture by Mr. F. L. Nicholson, of the South Otago Freezing Co. Mr. Nicholson gave a very interesting address on his travels abroad, and illustrated many views of interest with both coloured

and black and white movie films. Following this, Mr. S. H. Saxby, Department of Agriculture, made the presentation of prizes in connection with the local pasture competition.

North Otago.

Duntroon.—Arrangements for a dance, and address by Mr. James Gerry on his trip to the Continent and England. During his address the speaker dealt with the landing of New Zealand produce in London. At the previous meeting each member gave a short talk on his idea of the best sheep to breed.

Enfield.—Selection of a team to debate with a Toc H team, the subject to be "That the Time is Ripe for a Major Immigration Scheme in New Zealand"; the club team to take the negative. An interesting address was given by Mr. W. Widdowson on the trip to Australia by the *Anzacs* Contingent.

Five Forks.—Talk by Mr. P. Cooney on "Causes and Cures of Lamb Mortality." The remainder of the evening was occupied by impromptu speeches.

Papakao.—Lecture by Mr. D. J. Ross on "Sheep." At the previous meeting Mr. J. T. Kibblewhite gave an address on "Trees."

Waitaki - Hilderthorpe.—Talk on "Farm Implements" by Mr. E. Reid, many useful hints being given. This was followed by a series of pictures exhibited by Messrs. Benson and N. Reid.

South Canterbury.

Albury.—Short talks by members on farming subjects. At the previous meeting Mr. C. C. Leitch, Department of Agriculture, addressed the meeting on "Grasses and Clovers," stressing particularly the value of certified seed. This is a new club with good prospects.

Arno.—Talk by Mr. C. Kippenberger on "The Work of the W.E.A."

Geraldine.—Discussion regarding proposed tour of North Island. Interesting talk and demonstration

on the "Sharpening of Saws" by Mr. W. A. Sherratt. The speaker discussed and demonstrated on three different types of saws.

Maungati.—Lantern lecture on "Certification of Grass and Clover Seeds" by Mr. Millar, Department of Agriculture.

Pleasant Point.—Discussion re proposed North Island tour, and lecture by Mr. L. E. Finch on "Some Aspects of the Law in Relation to Farming." The speaker dealt with many interesting points in connection with the Fencing Act, Stock Act, &c.

Southburn-Lyalldale.—Debate with the Maungati Club for the Howell Cup, the subject being "That the Young Farmer of To-day has Greater Opportunities than his Grandfather." The teams were as follows: Maungati (affirmative), R. Howell, D. McNeill, and G. Dale; Southburn (negative), M. Tooley, J. Stowell, jun., and K. Card. Mr. S. Black, of Timaru, acted as judge, and gave the decision to the affirmative side.

Waiharuru.—A challenge was issued to the Women's Institute to a debate. An interesting account of the Y.F.C. Australian tour was given by Mr. C. M. Whattman, the leader of the New Zealand team. At the previous meeting a lecture was given by Mr. E. J. Lukey, Government Veterinarian, on "The Care of the Ewe Flock."

Mid-Canterbury.

Hinds.—Discussion on stock-judging competitions at Ashburton A. and P. Show, to be conducted as an inter-club contest. Lecture by Mr. C. K. McPherson, Department of Agriculture, on "Fertilizers."

Mayfield.—Club to support stock-judging competitions at the Ashburton A. and P. Show in November. Address by Mr. Vincent, Mount Somers Lime-works, on "The Manufacture of Agricultural Lime." The speaker also dealt with the formation of lime deposits, and exhibited a number of samples.

Methven.—Address by Mr. R. J. Low, Highbank, on "The Management of Breeding-ewes." Mr. Low stressed the importance of compulsory exercise for pregnant ewes, and dealt with denching, growing of supplementary fodder crops, and the importance of high-quality feed, giving many interesting points on his own personal management of his stud and flock ewes.

Christchurch.

Darfield.—Arrangements for annual ball. The following members spoke on their impressions of the North Island while on tour: F. Johnson, M. Jenkins, J. Gallagher, and L. McLaughlin. A football match was played against the Ellesmere Y.F.C., the Darfield Club winning by 11 points to 5.

Dunsandel.—Lecture by a club member, D. H. Johnston, on his tour of Australia.

Ellesmere.—Lecture by Mr. R. A. Calder, of the Agronomy Division, Lincoln, on "Plant Breeding."

Ladbrooks.—Arrangements for field-day and annual ball. The following members spoke on their impressions of the North Island while on tour: R. Anderson, O. McDrury, W. Wood, and M. J. C. Meyer.

Little River.—Address by Dr. I. W. Weston, of Lincoln College, on "Methods of Raising Finance for the Purchase of a Farm." Mr. L. W. Blackmore, District Secretary, was also present and spoke on club matters.

Teddington.—Talk on "Lamb Mortality" by Mr. G. K. L. Knott, Government Veterinarian.

North Canterbury.

Oxford.—Report of the North Island tour by N. Skurr and C. Gamble, members who took part.

Scargill-Omihiki.—Arrangements for club ball. Lecture on "Lamb and Hogget Troubles" by Dr. M. C. Franklin, of Lincoln College.

Marlborough.

Blenheim.—Discussion re fat-lamb judging competition to be held at Blenheim A. and P. Show. Impromptu speeches by members. At the previous meeting a lantern lecture was given by Mr. D. R. Wilkie, Department of Agriculture, on "Rye-grass Strains." The speaker also dealt with the local manurial trails. A suggestion from the Dovedale (Nelson) Club regarding a tour of the South Island in April next was discussed, and an invitation to a field-day from the Seddon Club was also discussed.

Flaxbourne.—Evening devoted to impromptu debates, all members taking part. At meetings not previously reported, talks were given by Mr. J. M. Stewart, Veterinarian, on "Stock Diseases," and Mr. Harris, Soil Survey Department, on "Soil Survey Maps."

Seddon.—Impromptu speeches (two minutes each); subjects were placed in the hat by all members present, each drawing in turn. On the vote of the meeting for the best speaker, A. Hammond and W. Dysart tied. At meetings not previously reported a lecture on "The Blow-fly Pest" was given by

Mr. McFarlane, and a talk on "The Mysteries of Wireless" by Mr. Wastey. The Seddon Club was successful in a debate with Blenheim Club, but, as the secretary puts it, "very unsuccessful" in a football match!

Nelson.

Dovedale.—Mr. Albert Max, a local farmer, gave a talk entitled "A Trip to Europe," which comprised some of his experiences while on tour with a party of farmers in 1936.

Motueka.—A very instructive field-day was held, members visiting the tobacco-factory at Motueka, where they were shown round by the manager, Mr. Chas. Lowe.

Motupiko.—Discussion re tour of South Island as proposed by the Dovedale Club. A stock-judging competition at the Nelson A. and P. Show was also dealt with. General discussion on "The Best Type of Sheep for the District." A field-day was held on Mr. F. R. Berrymann's property, and took the form of a post mortem examination of a bullock by Mr. Blair, Government Veterinarian; the animal was opened up and the functions of the various organs explained. The bullock was suffering from the disease known as "lumpy-jaw."

Moutere.—Discussion re junior judges to assist at Nelson A. and P. Show. Debate with the Farmers' Union, the subject being "Autumn v. Spring Topdressing." The club team won the debate by 170 points to 153; the judge, Mr. M. Palmer, of Waimea, complimented the speakers on their efforts.

Wairarapa.

Alfredon.—Lecture by Mr. W. J. Gray, Government Veterinarian, on "Diseases of Live-stock."

Balance.—Arrangements for club dance; discussion regarding improvement of club and club work generally.

Carterton.—Arrangement for club dance, and also a debate with Martinborough Club. Lecture by Mr. G. E. Allen on "Sheep-farming in General."

Eketahuna.—Challenge to a debate by the Mangatainaka Club accepted, and team selected. Club members to prepare a talk on "Tree Planting," to be broadcast from 2YA. Lantern lecture by Mr. N. Lamont, Department of Agriculture, on "Common Pests"; slides were shown depicting the life-cycles

of the white butterfly, diamond-back moth, and grass grub. The speaker also dealt with the parasitic control of these pests and the success obtained by the Department in this direction.

Greytown.—Interesting and instructive talk by Mr. R. Tilson on "Fat-lamb Production."

Mangatainaka.—Ensilage and fat-lamb competitions discussed. Arrangements for annual dance. Talk by Mr. F. E. Ward on "Comparisons between Farming in England and New Zealand." At the previous meeting Mr. N. Lamont, Department of Agriculture, gave a lecture on "Common Pests."

Martinborough.—Discussion on Y.F.C. shearing competition to be held at Palmerston North. Club debate, "That the Rural Dweller can Live as Useful and Intellectual a Life as the City Dweller." The debate was won by the team supporting the negative.

Tinui.—Address by Mr. C. Roberts, of Murray, Roberts, and Co., dealing with the "History of Wool." The speaker traced the wool from the sheep's back to the finished cloth, dealing with work in the woolshed and the woolstore, the buying, transport to Bradford, &c. He described the sorting of fleeces, and the blending and scouring of the wool, and also exhibited samples of tops, &c., and explained the differences between woolen and worsted yarns.

Manawatu.

Colyton.—Decided that all members should be supplied with Y.F.C. badges, cost to be met out of club funds. Proposed field-day discussion. Film showing caterpillar tractors exhibited.

Feilding.—Arrangements for club dance. Address by Mr. L. J. Wild, Feilding Agricultural High School, on "Agriculture Abroad."

Fitterbert.—District debating contest discussed; the club was successful in reaching the semi-finals. Arrangements made for the next debate against the Levin Club at Linton.

Kairanga.—Debate between Rongotea and Kairanga Clubs, the subject being "That Speed is not the Greatest Factor in Causing Accidents on New Zealand Highways To-day." The team were as follows: Rongotea, R. Brown, M. Huddleston, G. Pearson; Kairanga, A. Mikkelsen, A. Ploen, I. Fraser. The judge, Mr. A. Wright, of Palmerston North, awarded the decision to the Kairanga team by one point, and gave a full criticism which was greatly

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appreciated. A brief talk on the value of Y.F.C. stock-judging competitions was given by Mr. C. J. Hamblin, Department of Agriculture.

Kimblinton-Kiwitea.—Final arrangements for ball. Address by Mr. Gordon Elliott on "Parliamentary Procedure."

Levin.—Club members visited the Levin Telephone exchange. Remainder of evening devoted to impromptu speeches. The club entertained members of the newly formed junior division of the W.D.F.U. to supper.

Oroua Downs.—Lecture on "Lucerne" by Mr. A. J. Galpin, Department of Agriculture.

Onaki-Te Horo.—Lecture by Mr. A. J. Galpin, Department of Agriculture on "Lucerne." At the previous meeting Mr. W. L. Bradfield, of Levin, gave a talk on "Shelter-trees."

Paraparumu.—Decided to purchase a "Cavalade" banner. Lecture on "Lucerne" by Mr. A. J. Galpin, Department of Agriculture.

Pohingina Valley.—Field-day at Massey College. Demonstrations included the following: Romney hoggets and Polled Angus heifers (Mr. Morton), Jersey cow (Mr. Randford), Friesian cow (Mr. Clifford), Ayrshire cow (Mr. Colman).

Rangiwahia.—Lantern lecture by Mr. E. Bruce Levy, Director of the Grasslands Division, Plant Research Bureau, on "Impressions of Agriculture Overseas." Members of the Farmers' Union were invited to this meeting, and there was a large attendance.

Rongotea.—Lecture on Top-dressing" by Mr. A. W. Hudson, of Massey College. A club debate was held at a previous meeting. Members who took part in the Educational Tour also gave their impressions and experiences.

Shannon.—Discussion on Y.F.C. sheep-shearing competitions. Lecture by Mr. A. J. Galpin, Department of Agriculture, on "Mole Draining," a short film being exhibited.

Whakarongo.—Talk by Mr. G. S. Robinson, District Secretary, on the Y.F.C. sheep-shearing competitions at the Palmerston North Show in November. Lecture by I. W. Gorman, Plant Research Bureau, on "Strains in Grasses and Clovers." At the previous meeting Mr. R. Denize, Inspector of Stock, gave a lecture on "Animal Husbandry."

Southern Hawke's Bay.

Dannevirke.—Film dealing with caterpillar traitors exhibited. At the previous meeting Mr. A. D. Laing, Government Veterinarian, gave a lantern lecture on "The Care of Breeding-ewes."

Norsewood.—Arrangements for a club dance. Lecture by Mr. R. Somerville on the electric fence."

Onga Onga.—Subject and speakers chosen for forthcoming debate. Mangold-growing competition discussed; Norsewood and Takapua Clubs to be invited to compete. Formation of new clubs in the district was also discussed. Lecture by Mr. J. W. Palmer, Department of Agriculture, on "Lucerne, Supplementary Crops, and the Establishment of Pastures."

Takapua.—Arrangements made for a field-day. Club debate, "Tractor v. Horse." E. Thomson and E. Taylor spoke in favour of the tractor, and W. Craig and M. Tilley for the horses, the result being declared a draw.

Northern Hawke's Bay.

Meeanee.—Arrangements for a debate at the next meeting. Mr. Geo. Westbrooke, Apiary Instructor, Department of Agriculture, gave an instructive lecture on "The Life-cycle of the Bee."

Putorino.—Arrangements re hall, &c. A useful address was given by Mr. T. W. Hercock on "How to Conduct a Meeting." This was followed by five-minute talks by club members as follows: "The Manufacture of Cheese" (J. Holburn), "Dealing with trouble in Ewes" (D. McLean), "The Advantages of Lucerne" (E. Smyth). This is a new club, which will form a very definite link between the Meeanee and Wairoa-Nuhaka Clubs.

Wairoa.—Discussion on the shearing contests at both Poverty Bay and Manawatu A. and P. Shows. Reports by delegates on the Northern Hawke's Bay District Committee meeting, and also on the annual meeting of the Federation. Talks by Mr. C. M. Pilkington, Government Traffic Officer, on "Driving Regulations," and Mr. G. Westbrooke, Department of Agriculture, on "Bee-keeping." At the previous meeting a talk was given by Mr. W. J. Lee, Department of Agriculture, on "The Grading of Cream, and the Grading and Marketing of Butter."

Poverty Bay.

Te Karaka.—Lecture by Mr. W. J. Lee on "Cream-grading and the Production of High-quality Cream."

Tolaga Bay.—Talks by club members as follows: "Working a Dog in Dog Trials" (F. Calcutt), "Lucerne through the Ages" (D. Donald), "A Pro-Met against Raising the Age-limit for Club Membership" (T. Post.) At the previous meeting impromptu speeches were made by all members present.

Waipua.—Lecture by Mr. E. J. Simmons, Government Veterinarian, on "Wounds in Animals, and their Treatment"; lecture by Mr. E. M. Bates, Department of Agriculture, on "Harvesting."

Wanganui.

Bulls.—Team selected for a debate with Hunterville club, the subject being "That Dairy-farming is a More Pleasant and More Profitable Occupation than Sheep-farming." A practice debate was held, the judge, Mr. C. B. Anderson, making the award as follows: Dairy-farming supporters, 30 points; sheep-farming supporters, 35 points. At the previous meeting a "talkie" film was exhibited illustrating "Modern Farm Implements."

Marton.—The secretary, H. B. Marshall, who was a delegate to the annual meeting at Christchurch, outlined the more important business that was transacted. Arrangements for a debate. Mr. J. C. Hammond, Marton, gave an address on "Mangel-growing," and concluded with some useful hints on shearing-machines, &c.

Taihape.—Club debate, the subject being "That the Young Farmer of To-day has Equal or Greater Opportunities than his Grandfather." At the previous meeting Mr. L. J. Wild, Feilding Agricultural High School, gave an address on "Impressions gained during a Trip through Canada and Great Britain."

Waimarino.—Arrangements for field-day in conjunction with the Wanganui Jersey Cattle Club. A discussion was held on the subject of "Sheep-farming v. Dairy-farming." The speakers in favour of sheep-farming were F. Frederick, T. Baker, H. Meyer, and E. Todd, and those in favour of dairy-farming were E. Whale, J. Drayton, J. Cranston, O. Hammond, H. V. Mountfort, and A. G. Mountfort.

Westmere.—Club dance finalized. Lecture by Mr. B. Dawes on "Farming in Fiji."

South Taranaki.

Alton.—Arrangements for dance. General discussion on the annual meeting of the Federation.

Pukengahu.—Final arrangements for a debate with the Eltham Club. An address was given on "A Recent South African Rout" by Mr. Harper. At the previous meeting a debate was held with the Farmers' Union the subject being "Sheep-farming v. Cropping." The Farmers' Union supported the cropping, and were awarded the decision on points.

North Taranaki.

Karawaka.—Arrangements for a club debate, and also for a dance and euchre party. Address by Mr. H. E. Blyde on "How to Conduct a Meeting." Mr. G. A. Blake, District Secretary, outlined the business conducted at the recent District Committee meeting.

Okau-Tongaporutu.—A field-day was held on Mr. W. A. Burton's property at Tongaporutu. Mr. Burton gave a talk on "Pig Management," and showed members over his pig lay-out. The club also held a field-day in conjunction with the annual judging of the district hay and silage entries by Mr. A. G. Elliott, Department of Agriculture. Stocks were judged by members of the trophy held by the Farmers' Union. The score cards were tabulated by Mr. G. A. Blake (District Secretary), who was in control of the activity, and the detailed sectional differences in the stacks compared with the judge's award. The results were as follows: M. Collins, 1; C. O. Donnell, 2; O. Collins, 3.

Te Kuiti.

Te Anau Central.—Club debate, "Polled Angus v. Hereford Cattle," judged by Mr. K. M. Montgomery, Department of Agriculture.

Rotorua.

Horohoro.—Arrangements for ploughing match; stewards, prizes, rules, &c.; also arrangements for smoke concert. A successful tour of the Waikato was recently undertaken by this club, visits including Mr. A. R. Vosper's property, Putaruru, where a very up-to-date pig-feeding plant was inspected, the Te Awamutu Co-operative Dairy Co.'s piggery, the Arapuni power-house and spillways, and Ruakura Experimental Farm. Mr. Luxton's pedigree Jerseys were also inspected, and the members were shown farming-methods on the property of Mr. Mortimore.

Eastern Bay of Plenty.

Edgecumbe.—Presentation of certificates of merit in connection with the pasture competition, 1937-38 by Mr. F. Reynolds, as follows: R. Strachan (177 points), 1; C. A. McCracken (170 points), 2. Arrangements made for a debate between Waimana and Paengaroa to be held at Thornton, this being the final of the shield competition. A lantern lecture was given by Mr. Thomson, Veterinarian, on "Farm Diseases, and their Treatment." A debate was held at Taneatua against the Waimana Club, the subject

being "That All-the-year-round Dairying is more Profitable than Seasonal Dairying." The teams were as follows: Edgecumbe, F. E. Briggs, R. Strachan, J. Murray, and J. Tollemache; Waimana, C. R. White, E. Woolfield, L. Macdonald, and H. White. The judge, Mr. Mead, of Taneatua, gave the award to the Waimana team, which took the negative side.

Taneatua.—Business meeting; club affairs discussed; decision made to carry on despite small membership.

Waimana.—Arrangements for club's second birthday party. Debate with Edgecumbe Club at Taneatua (details given under Edgecumbe notes).

Western Bay of Plenty.

Katikati.—Lecture by Mr. A. V. F. Allo, Department of Agriculture, on "The Certification of Seeds."

Paengaroa.—Arrangements for annual dance and for field-day at Mr. Ross's piggeries. Practice debate in preparation for debate with the Waipi Club. This debate, which was in the third round of the shield contest, took place at Tauranga. The subject was "That Radio has a Greater Influence than the Press." The teams were as follows: Waipi (affirmative), H. Chester, N. Wheatly, A. Sutton, and A. Martyn; Paengaroa (negative), A. Walker, E. Pinker, V. Benner, and P. Hickson. The judge, Mr. F. Cook, gave his decision to Paengaroa, who scored 334 points to Waipi's 308. Mr. J. B. Cavte acted as timekeeper. Supper was served at the conclusion by the Tauranga Club.

Te Puke.—Business meeting; address by Mr. A. V. F. Allo, Department of Agriculture, who has succeeded Mr. C. Walker as District Secretary.

Waikato.

Huntly West.—Discussion re dance, &c. Address by Mr. J. O'Sullivan on "How to Conduct a Meeting." Debate on "College Education for Farmers' Sons." This is a new club with good prospects.

Kakepuku.—Address by Mr. A. J. Sinclair, secretary-manager of the Te Awamutu Co-operative Dairy Co., on "The Conduct and Procedure of Public Meetings." A new club with good prospects; twenty members already.

Te Kowhai.—Arrangements for debate and field-day. Lantern lecture by Mr. H. Woodyear-Smith on "The Certification of Rye-grass, Cockfoot, and Clover Seed." A field-day was held on Mr. E. C. Hockin's farm; demonstrations included "Pigs," by Mr. C. Harrington, and "Cows," by Mr. Dale.

Auckland.

Mangatawhiri.—Discussion re the Country Library Service.

Dargaville.

Arapohue.—Arrangements re club programme. Lantern lecture by Mr. H. Arnold, Department of Agriculture, on "Ensilage." The speaker dealt with the making of ensilage, its feeding-value, methods of feeding, types of ensilage, and discussed the merits of pits, silos, and stacks. A field-day was held at the Northern Wairoa Experimental Farm. At 10 a.m. Mr. E. Bruce Levy, Director of the Grasslands Division, Plant Research Bureau, gave an address on "Pastures," after which he showed members over the paddocks, drawing attention to many items of interest, and in particular the marked difference between pastures sown with certified and uncertified strains of seed. At 2 p.m. Mr. C. E. Ballinger, of the Ruakura Experimental Farm, gave an address on "Pig-feeding," and dealt with the experimental work carried out in that connection. At 8 p.m. Mr. Levy gave a lantern lecture entitled "Impressions of Grassland Farming Overseas." The field-day was attended by members from the Arapohue, Marohemo, and Ruawai Clubs.

Marohemo.—Lecture by Mr. H. Woodyear-Smith on "Pasture Plants and their Management."

Ruawai.—Address by Mr. P. W. Smallfield, Fields Superintendent, Department of Agriculture, on "The Activities of the Ruakura Farm of Instruction." The speaker dealt with all phases of the work being carried out at Ruakura, including pig-feeding trials, pasture experiments, ragwort eradication, and the work in connection with facial eczema.

Whangarei.

Matarau.—A field-day was held on Mr. H. E. Johnson's property. The attendance included members of the Ngauratua Pig Club and other visitors. An inspection was made of Mr. Johnson's piggeries. Mr. Johnson demonstrated the points of the animals, and gave an instructive talk on the feeding of pigs without milk.

Maungakarama.—Election of officers, &c. Address by Mr. A. T. Brainsby on "How to Conduct a Meeting." This is a newly formed club with good prospects.

Health Notes for the Farm.

Contributed by the Department of Health.

Nursing Services and the Conquest of Disease.

NURSING is a larger development of the mother-care of the young, and must have co-existed with this care from the earliest time. The word itself comes from the word meaning "to nourish." In its broadest meaning it covers not only the care of the sick, the aged, the helpless, and the handicapped, but the promotion of health and vigour in those who are well, especially the young, growing creatures on whom the future of the race depends.*

It has been said that the Crimean War left behind it countless international embarrassments and only one boundless good—the birth of the trained nurse. This gave Florence Nightingale her opportunity and the world the modern nurse. Those readers of the *Journal* who have been patients in a hospital, or under the care of a nurse in the home, or have been associated with hospital work, must many times have been impressed with the service performed by nurses—a service truly dedicated to the cause of suffering humanity. An eminent nursing authority remarked in an address to young students: "I have found in hospitals, and particularly among nurses, the purest unselfishness, the sternest devotion to duty, the simplest and most unaffected bravery, and the richest traditions of disinterested service that I have ever known."

Training of Nurses.

In New Zealand, apart from nurses in private practice, there are some nine hundred qualified nurses and one thousand eight hundred pupil-nurses in public and State hospitals engaged in this good citizenship, in work of responsibility demanding a high standard of knowledge which is gained only by careful tuition and practical experience. The constant



Florence Nightingale

advancement in the fields of medicine and surgery, together with a better knowledge of psychology, have made it imperative to produce not merely trained hands, but instead cultured, well educated, highly equipped young women to meet to-day's nursing needs.

At the same time, however, there should not be expected too much of nurses. Surely no more nor less than we expect

of any other modern, intelligent woman who is trying to meet her obligations to society, to earn her own livelihood, and at the same time to extract as much legitimate pleasure from life as is consistent with her ideal of service and obligation to others. Our schools of nursing fully realize this, and they make every endeavour to ensure that the training of those who have chosen this career is both attractive and interesting and well within the mental and physical powers of the average healthy young woman.

Meaning of Nursing.

Nursing, in its modern conception, means more than bedside care. It includes health conservation as well as bedside nursing, health education as well as ministration to the sick, the nursing care of the whole patient (mind as well as body), the care of the patient's environment (social as well as physical), and health service to families and communities as well as to individuals.

The purpose of this article is mainly to direct attention to certain of the spheres of nursing which come under this newer preventive field of medicine, which aims to lengthen the span of life and make it more effective.

Ante-natal.

The medical profession has for many years recognized the necessity of systematic ante-natal supervision, which has proved beyond doubt to be beneficial to the mother and the child. To give this supervision, free ante-natal clinics staffed with specially trained nurses have been established in all maternity hospitals authorized for the training of midwives, at St. Helens Hospitals, and by the Plunket Society. The majority of expectant mothers are attended ante-natally by their own doctors, who are assisted by these forty ante-natal clinics

*"A Short History of Nursing," Lavinia L. Dock, R.N., and Isabel M. Stewart, R.N.

with their nurses. These clinics are under medical supervision, and work in close co-operation with private medical practitioners.

The value of this care is manifested in the statistics of any obstetric hospital in which there are well-organized ante-natal clinics. It is by the early recognition of abnormal conditions that the future comfort and health of the mother and child are safeguarded.

St. Helens Hospitals.

To assist those with moderate incomes, the St. Helens Hospitals established in the main centres afford a high standard of maternity service to expectant mothers. This service is given under the supervision of a medical superintendent, and in each institution is a matron with general training, experienced in midwifery, and a staff of specially qualified sisters.

As a further assurance that the mother is being safeguarded, the work of all maternity hospitals and maternity nurses throughout New Zealand is regularly inspected and supervised. It might be stated, also, that the qualified sisters in charge of private maternity hospitals are also doing excellent work for the protection of motherhood.

Plunket Society.

The important functions of the Plunket Society are so well known and appreciated that it is hardly necessary to dwell on them fully. Valuable advice at their child-welfare centres is always obtainable from the Plunket nurses, particularly as to the care and feeding of infants. This is a service that merits support.

It is a wise mother who seeks expert advice as to the rearing of her infant; it is not always a simple task for a nurse to uproot wrong habits which have become deeply entrenched. There are 126 Plunket nurses stationed throughout New Zealand.

District Health Nurses.

District Health nurses are employed by the Department of Health. The School Medical Service of this Department aims to prevent during childhood many of the disabilities and illnesses of adult life. The District Health Nurse assists the doctor in regular physical examinations. She visits the schools at intervals to supervise health generally, and to see children requiring frequent supervision and those referred to her by teachers or parents. She also visits the homes to discuss with parents the results of medical examination, giving general and special advice on measures to maintain health.

The pre-school child at home, in day nursery, and in kindergarten who is not

already being supervised by the Plunket Society is now being brought under the care of these nurses.

Child contacts of tuberculosis patients are taken to specialists for regular examination; the homes are visited, and advice given regarding measures, hygienic and other, which will ensure the child growing up with a good resistance to the disease. Other duties include work in health camps, infectious-disease work, and health educational talks to parents, associations, and teachers.

Parents should realize that the expert advice of these nurses is always available. The interest and co-operation of the parents is most essential, as it is realized that only in this way can the work be made truly effective. When the welfare of children is at stake the support which parents give to school doctors and these nurses is of vital importance.

District Nurses.

In purely local areas District Nurses are engaged in an even more complete public-health service. In Maori districts, for example, their work includes what is already outlined under "District Health Nurses," and, in addition, bedside care, ante-natal supervision, some midwifery and infant welfare, social investigations and assistance, general and specific, on health, &c.

The Maori is one of the few Native races in the world living in active contact with civilization which has not materially decreased in numbers. There is no doubt that the educational service of these nurses in teaching the Maori people the ways of health has largely assisted towards this position. Much still remains to be done, but through the increasing co-operation of the leaders of the Native race the future is full of hope. Europeans in some rural areas also have such a complete health service available to them.

The influence of these nurses is far-reaching because of their intimate contact with the home and their ability to help with their own hands where there is sickness or suffering. Perhaps no approach gives the district nurses a better entry into the homes of the settlers than that of caring for the sick. It has been found that demonstration to the family of the practice of cleanliness, of sick-room hygiene, and of skilled nursing care does more to convert settlers almost unconsciously to a more healthful way of living than could be done by mere verbal instruction, no matter how carefully given. The nurses need every sympathetic co-operation in the districts in which they carry out their devoted and often most difficult work.

Dental Nurses.

Throughout the Dominion there are dental clinics in charge of dental nurses who have been specially trained in the treatment of children suffering from dental defects and in the education of parents as to the prevention of dental disease in their children.

In a previous article in the *Journal* on dental hygiene attention was drawn to the need for the co-operation of parents to make this important service fully effective.

Voluntary Nursing Services.

Space permits but brief reference to the activities of the nurses associated with the Red Cross Society, St. John Ambulance Association, the St. John Nursing Guild, and other similar organizations. In the nursing of the sick and needy and in their educational work in first-aid, hygiene, and home nursing they perform a humanitarian social service of a far-reaching beneficial nature. A general knowledge of home nursing and first-aid is of incalculable value, and parents who encourage their children to obtain such knowledge so widely and freely offered through such organizations render a distinct service to the State.

The public-health nurse, in general, has the major responsibility of interpreting to the community in simple and practical form the up-to-date scientific knowledge which will ensure for all perfect health and more effective living.

Noble Profession.

In conclusion, it is fitting that a tribute should be paid to nurses in private practice. Their ministrations in private hospitals and in thousands of homes reflect in a high degree the spirit of the traditions of their profession. The service of the nurse trained and qualified in the testing school of our hospitals is accordingly accepted with confidence whether it be for the expectant mother, the infant, the school-child, or the adult. It is she "who in the hour of trial breathes communicable strength when in the dead of night life pauses in the veins and men fear. It is she who puts to flight surrendering thoughts, fans courage to its last flicker, and rejoices with the indomitable soul."

Nursing is an attractive and noble profession, with a wide sphere of usefulness which should appeal to young women bent on faithfully serving their generation. New Zealand needs women adequately to meet the nursing requirements of the sick in hospitals and the ever-increasing demands of expanding social services. The trained nurse is a vital unit in the vanguard of public-health workers engaged in the conquest of disease.



The Farm Home and Kitchen.

Contributed by Department of Home Science, University of Otago.

Use and Construction of Fireless Cookers.

HAY-BOXES or fireless cookers are almost universally used in Europe as a means of saving fuel. This article on fireless cookers has been prepared to show their usefulness and give an idea of their construction and use. Here are some of the useful purposes to which housekeepers report having put their fireless cookers:—

- (1) While preparing Sunday breakfast they partly cook the Sunday dinner, and then leave it in the hay-box to finish cooking while they go to church.
- (2) Similarly, when going out for the day they leave the men's meals cooking in the hay-box.
- (3) They pack the dinner in the cooker into the dray or car in which the men leave in the morning for the harvest-fields or the stock-sale.
- (4) They leave puddings, &c., cooking while they spend the morning washing or gardening.
- (5) When unusually large amounts of cooking have to be done they save fuel and give themselves more stove space by doing the boiling and stewing in the hay-box.
- (6) They set the bread to rise overnight in the fireless cooker over a pan of warm water in cold weather.
- (7) They use it to keep cold things cold in hot weather.
- (8) Meals for late-comers were cut off or served and put into the hay-box over a pan of hot water, and were thus kept hot and moist until wanted.

Slow Cooking.

The hay-box, or fireless cooker, is able to do all these useful things, because it is so constructed that whatever is put

into it will lose or gain heat from its surroundings very slowly. Just as a thermos flask retains heat, so does a well-insulated fireless cooker. Consequently, once a saucepan of boiling porridge or one containing a piece of corned beef has been heated through on the stove, if quickly put into a well-made fireless cooker, it will hold enough heat for the next three or four hours to cook the food completely without any attention.

It is impossible to over-cook the food, and equally impossible to cook it too quickly, using a fireless cooker. Fireless cookers, however, are not suited for all kinds of cooking, as one cannot fry, roast, or bake in them, but they are adapted for cooking those foods which require long, slow cooking—namely, cereals, dried fruits, and vegetables, and the cooking of the tougher cuts of meat and stews and poultry. The results in these latter cases are often superior to those obtained by any other method.

Commercial fireless cookers are usually made with metal linings and fireproof insulating-material, and are also usually supplied with "stones" which may be heated and put under the vessel of food to give extra heat. The use of "stones" makes it possible to keep the contents hot much longer and to cook large joints of meat, &c., without any reheating. In the simpler type of hay-box without hot stones the insulating-material is frequently hay, although sawdust and rolled up balls of newspaper, &c., are equally as good.

Simple Construction.

These are very simply made at home, and are excellent for cooking porridge, for keeping things hot, and for completing the cooking of foods more than started on the range. The fireproof one, including the hot stones, can also be made at home, but not quite so simply. Its increased efficiency and greater usefulness,

however, more than make up for extra trouble and cost in making.

To make either a hay-box or a fireproof fireless cooker the first requirement is a large box or trunk of wood or metal, preferably wood. If you intend having two wells to hold cooking utensils, the length of the trunk must be not less than three times the diameter of the utensils you will use, and the width about one and a half times it. The depth should be at least 6 in. more than the depth of the utensil, or the combined depth of the utensil and stone, in the case of a fireproof fireless cooker.

The cooking-utensil must have no projecting handle, and hence an enamel or aluminium billy is usually used after a tinsmith has put on clips that will hold the lid on tightly. Specially made utensils with clamping-on lids may be bought, having the same diameter but of varying depths, so that you can have them full-sized, half-sized, or quarter-sized, which is, of course, useful for cooking different meals and a variety of dishes at once. The box or trunk must be large enough to allow for plenty of insulating-material all around, above, and below your cooking-utensil. It must have a well-fitting lid with strong hinges, and a hasp or lock to fasten it.

Well for Utensils.

The next thing to do is to prepare the well into which the utensil or utensils are to fit. In a hay-box it can be made of calico or cardboard, but for a fireproof cooker it is best to have a tinsmith make one of sheet tin or zinc. The nest, which is made to fit the utensil, giving a snug but not too snug a fit, consists of a cylindrical well with a circular bottom attached. To attach the well to the sides of the box and to cover the insulating-material that is to be placed round it, there is what is known as the collar, which

is made of the same material as the well. This is cut to fit the box or trunk, and the well is fitted into a circular hole made in its centre.

If you cannot get a mental picture of what the well and collar are like, imagine a top-hat upside down. The crown is the well, the brim is the collar, and the utensil is to sit in the crown. The whole of this is made of tin or zinc in the case of the fireproof cooker, the well of which is made extra deep to hold not only the utensil, but also the hot stones as well. Calico or cardboard are sufficient in the hay-box, and no extra depth need be allowed.

Suitable insulating-materials for the hay-box are soft hay, ground cork, tightly crumpled newspaper, and wool or feathers. If hay is used, be sure that it is soft and dry. The sawdust, too, should be dry; and wool or feathers, if used, should be scoured and dried.

Insulating Material.

The fireproof cooker requires several layers of asbestos paper between the packing-material and the well. This can be bought in large sheets costing 6d. per pound at most hardware stores. To pack the box with insulating-material, first line it with several layers of smooth paper, either newspaper or packing-paper. This will prevent cold air and dust from finding their way into the box. Next pack the crumpled paper, hay, or wool firmly into the bottom of the box until a layer not less than 4 in. thick has been made. This should raise the cooking-utensil on its hot stone, if one is to be used, to about 3 in. or 5 in. from the top.

The next problem is how to pack insulating-material all around the well, which is to stand in the centre of the box. In the case of the calico well this is simple. The utensil is put into the well to make it rigid, and the material is tightly packed all around it until the level of the collar is reached. The collar is then tacked to the side of the case, and the packing is finished.

Where there is a rigid collar, however, it is impossible to pack around the well, in which case the utensil is used for the block to mould the hole in the packing-material, and is withdrawn carefully when the correct level is reached and the well inserted in its place. This requires some care, but it can be done, especially if a sheet of paper is wrapped around the utensil first and is left lining the hole after the utensil has been withdrawn.

Fireproof Fireless Cooker.

When the fireproof fireless cooker has to be made, as soon as the bottom of the box has been covered with the insulating-material, many layers of asbestos paper, to give a pad at least $\frac{1}{2}$ in. thick, must be placed under where the well is

to stand. The sides of the well are then wrapped around with asbestos paper to form an equally thick padded layer. This paper is always cut about 3 in. wider than the depth of the well, and is wrapped so that the extra length projects past the bottom of the well. This extra length of paper is then slashed with strong scissors and folded neatly under the well. This gives a double pad at the bottom, and at the same time ensures that the bottom corners are properly fireproof. As the hot stones are to sit in the bottom of the well, this is particularly important. This well, complete with its fireproof insulation, is next lowered into the hole in the padding-material as already described.

On the top of the box there is still a space of 3 in. to 5 in. between the top of the collar and the top of the box. This must be completely filled with a cushion made to fit the top of the box and stuffed with hay or paper. The cushion should be slightly on the large size, so that when the lid is closed and fastened down the cushion is pressed firmly on to the collar and the top of the utensil. This is an important part of the insulation.

Making the "Stones."

The hay-box would now be ready for use; but for the fireproof cooker there still remains the stone. These may be made of iron, soap-stone, or concrete, and should exactly fit the well, allowing, say $\frac{1}{4}$ in. for expansion. They are usually about $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. deep, and have a recessed handle like a stove lid for ease in lifting. A blacksmith can cut a solid iron one, or it can quite simply be made of cement. Use 1 quart of fine, sifted sand to 1 pint of fresh cement, and mix to a soft paste with water. Make a cardboard mould the size of the inner well, and pour the mixture into it until half full.

Lay on top of this a small, circular piece of wire netting or wire gauze with a bent piece of fencing wire threaded through it. The bend is an upward loop which should reach nearly to the top of the cardboard mould. Now pour in the mixture until it is level with the top of the mould and covering the wire loop. In an hour or so, when the cement begins to harden, scoop out a circle about 1 in. deep around the loop. Allow the mould to harden for about two days in a warm, dry place, and then temper it by placing it in cold water and boiling for fifteen minutes.

The purpose of the "stone" is to supply extra heat, and while the food to be placed in the fireless cooker is being precooked it must be heated in the bottom of the oven, on the range, or over an electric element. It should be hot enough when used to give a faint spit when tested with a moist finger.

Success in Cooking.

Success in using the cooker depends on a clear understanding of the principle on which it is based—i.e., the cooking by retention of heat. Hence, as much heat as possible must be put into the fireless cooker. A large volume of water contains more heat than a small one, although the temperature is the same. The total quantity of food is therefore an important factor, and the larger the quantity of food the higher the temperature will be at the end of a given period.

The utensil should always be nearly filled, as space above the food means loss of heat. If the utensil is not big enough to fill the well an insulated cushion should be placed over it, always remembering that if stones are used an asbestos cushion is needed. A third point to remember is to place the food boiling hot in the cooker as quickly as possible. Therefore, have it open near the stove, put in the food, cover it with the cushion, and close the lid as fast as possible. Do not open it until the food is cooked.

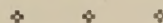
Experience will soon show you how long your cooker retains the heat and whether you will have to reheat the food before serving it at the end of any given period. In some cases, such as in cooking haricot beans, the food will need bringing to the boil a second time and returning to the fireless cooker before they are quite tender. Other points to remember are that there is no evaporation, so that foods are moister, and that seasoning must be done in advance—i.e., when the food is inserted in the first instance.

Assessing the Time Needed.

The time to cook the food depends not only on the food itself, but also on the length of time for which it was first heated on the stove. Large masses, such as ham and pot roasts must be boiled or roasted until thoroughly heated through, and the larger and denser the pieces the longer the preliminary cooking must be. With porridge, &c., where the particles are small, only a moment's brisk boiling will be needed. In general, one should allow twice as long in the fireless cooker as on the stove.

How to Experiment.

It is wiser, however, to experiment with a hay-box by cooking porridge, milk puddings, stewed fruit, dried fruits, and vegetables until you are sure of how to use a fireless cooker than to attempt to cook meat. A fireproof cooker with stones is really needed for meat, as heat penetrates it very slowly. The hay-box, however, is every bit as good as the fireproof one for keeping anything hot for upward of an hour.



Recommended Recipes.

Lemon Chiffon Pie.

Filling.

Gelatine, 1 tablespoon.
Cold water, $\frac{1}{4}$ cup.
Eggs, 4.
Sugar, 1 cup.
Lemon-juice, $\frac{1}{2}$ cup.
Salt, 1 teaspoon.
Lemon-rind, 1 teaspoon.

Method.—Soak gelatine in cold water for five minutes. Separate egg-whites and egg-yolks. Add half cup sugar, lemon-juice, and salt to beaten egg-yolks. Cook in double boiler until thick. Add softened gelatine to egg-custard, and stir until dissolved. Add rind; cool; add half sugar to beaten egg-whites. Fold in custard. Pile into pie-shell.

Pie Shell.

Melted butter, 3 tablespoons.
Ginger malted wafers (or any plain biscuit), 1 cup.

Method.—Mix together thoroughly until blended; line tin, moulding well. Leave for some time in a cool place. Fill with the above filling.

Carrot Cutlets.

1 cup carrots, boiled and mashed.
2 cups cold boiled rice.
Paprika.
1 tablespoon minced onion.
1 tablespoon celery salt.
1 egg (beaten).
Salt.

Method.—Mix the ingredients well. Form the mixture into balls, and flatten them in the shape of cutlets. Roll them in crumbs, egg, and again in crumbs. Sauté them in dripping. Place a cube of jelly on each cutlet, and garnish the dish with parsley.

Carrot and Apple Pie.

1 or $1\frac{1}{2}$ cups diced cooked carrot.
1 cup diced tart apples.
1 cup sugar.
 $\frac{1}{2}$ cup raisins.
1 tablespoon vinegar.
 $\frac{1}{2}$ cup water.
1 tablespoon butter.
Nutmeg and vanilla.

Method.—Cook the mixture, with the exception of the butter and the seasoning, until it is thick and clear. Turn it into a crust that has been baked, and cover with a meringue. Bake it in a slow oven for twenty-five minutes.

Fish Balls.

Flaked cooked fish, 1 cup.
Cooked mashed potatoes, 2 cups.
Egg, 1.
Butter, $\frac{1}{2}$ teaspoon.
Pepper and salt.

Method.—Combine fish and potato and mash well together. Add butter melted, salt and pepper, and well beaten egg. Mix thoroughly. Should this mixture be too moist a little flour may be added. Place frying-basket in fat at 380° F. and drop in spoonfuls of mixture and fry till a golden brown. Drain on paper.

Stuffed Sweetbreads with Peas.

Sweetbreads, 1 pair.
Bacon and ham.
Green peas.
Tomato or mushroom.
Parsley.

Method.—Parboil and blanch sweetbreads. With a sharp knife slit each lengthwise, and take out a teaspoonful of meat from the centre of each. Fill the cavity thus prepared with forcemeat made by chopping the meat extracted with an equal quantity of sautéed bacon, a little tomato, and $\frac{1}{2}$ teaspoon chopped parsley. Season with a few drops of onion-juice. Press the stuffed halves closely together and tie firmly. Place on a rack in a roasting-pan and lay a strip of bacon over each and pour a little stock into the pan. Cover closely and cook half an hour. Turn the sweetbreads, baste thoroughly, cover and cook about ten minutes, then baste with butter, dredge with flour, and allow to brown. Take out the sweetbreads, thicken the broth, season and serve in a separate dish. Surround sweetbreads with peas, buttered and seasoned with salt, pepper, and paprika. Sweetbreads may be cooked in a casserole. Temperature of oven 350° F.

Creamed Sweetbreads.

Sweetbread, 1.
Butter, 2 tablespoons.
Flour, 2 tablespoons.
Milk, 1 cup.
Salt, $\frac{1}{2}$ teaspoon.
Pepper, $\frac{1}{2}$ teaspoon.

Method.—Parboil the sweetbread and cut into $\frac{1}{2}$ in. cubes and reheat in white sauce made according to Roux method. Serve on toast or use as a filling for pattie cases or timbals.

Swiss Steak.

Steak (lean), 3 lb. ($2\frac{1}{2}$ in. thick).
Dripping, 3 tablespoons.
Flour, $\frac{1}{2}$ cup.
Salt, $1\frac{1}{2}$ teaspoons.
Pepper, $\frac{1}{2}$ teaspoon.
Tomato juice and pulp, $2\frac{1}{2}$ cups.
Onions (if desired), 3.

Method.—Sift the flour, salt and pepper together, and beat thoroughly into the meat. The beating makes the meat more tender and the flour absorbs the juice. Sear the meat in the hot fat in a large heavy pan. Cover with tomato juice and pulp or transfer to casserole. Place lid on cooking-vessel, and if cooked in pan simmer for two hours. If baked, use temperature 300° to 330° F. for two hours. If the gravy becomes too thick, add more liquid from time to time. There should be plenty of rich gravy to serve over the meat. Onions may be browned and cooked with the meat. Serve piping hot.

Meat Loaf.

Meat, 2 lb.
Salt, 1 teaspoon.
Egg (beaten), 1.
Parsley (chopped), 1 tablespoon.
Breadcrumbs, 1 cup.
Onion-juice, 1 teaspoon.
Pepper, $\frac{1}{2}$ teaspoon.
Milk or stock, $\frac{1}{2}$ cup.
Bacon, 2 rashers.

Method.—Wipe the meat with a damp cloth and mince it with the bacon. Add seasoning, mix well, add the crumbs, well-beaten egg, and milk gradually. Place in a well-greased pan. Put small pieces of dripping or strips of bacon on top. Bake forty minutes in a moderate oven (350° F.). Baste occasionally with one tablespoon of fat melted in one cup of boiling water. Serve with gravy or tomato sauce.

Tomato Sauce.

Tomato purée, $\frac{1}{2}$ cup.
Water, $\frac{1}{2}$ cup.
Salt, $\frac{1}{2}$ teaspoon.
Flour, 2 tablespoons.
Butter or fat, 2 tablespoons.
Pepper, $\frac{1}{2}$ teaspoon.

Method.—Melt fat in saucepan and add flour. Mix and heat until it froths. Remove from heat and add strained tomato-pulp and water slowly. Return to source of heat and stir until it thickens. Boil for two minutes and serve.

Founders of Modern Agriculture, No. 10.

J. W. WOODCOCK, Crop Experimentalist, Fields Division.

Louis Pasteur.

NO history of human progress would be complete without mention of Louis Pasteur (1822-1895), to whose pioneering work in the field of bacteriology we owe comparative freedom from plagues and epidemics. Agriculture has benefited enormously from Pasteur's researches.

Louis Pasteur was born at Dole, France, and in his early years he did not reveal much of the outstanding brilliance which was later to become manifest. He first became known to science as a chemist specializing in crystallography, but later turned his attention to the study of bacteria, of which little was then known. He discovered the cause of fermentation, and later saved the French wine industry from serious financial loss by investigating the cause of maladies from which the produce frequently suffered.

The result was the discovery of pasteurization. Of outstanding simplicity, it has acquired an habitual significance with regard to other perishable commodities such as milk and cream.

It was the entry of Pasteur into medical and veterinary science, however, which brought about his greatest success. His attention was first directed to the study of the infectious cattle disease known as anthrax, and he worked out a method of control by vaccination, a process which has since become widely used for other diseases in man and animals.

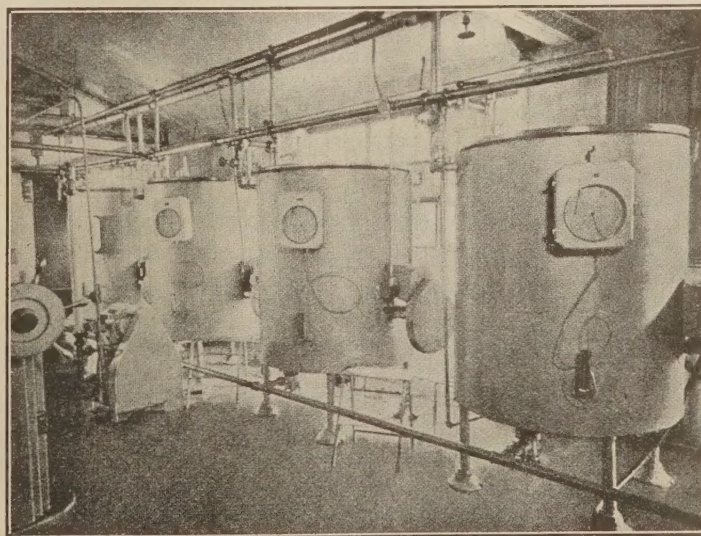
Pasteur met with severe opposition, chiefly from the medical and veterinary fraternities, which regarded him as a layman. No scientist, however, has triumphed over his critics so completely as when, before a large gathering of scientists who were mostly hostile, he injected anthrax germs into a flock of sheep, half of which had been vaccinated previously. The latter remained normal, while the unvaccinated sheep developed the disease and died.

The return of Pasteur from this scene is unique in the history of science—the victor walking from the scene of his success followed by cheers and applause, having changed doubt into certainty and satire into gratitude.

But the criticism was only silenced for a while. Pasteur's treatment for hydrophobia—the terrible disease afflicting those bitten by mad dogs—caused a storm of criticism from many of the medical profession. As with anthrax, however,



Louis Pasteur propounds his vaccination theory—a scene from Warner Bros.' film, "The Story of Louis Pasteur."



Pasteurization—the modern application of the method evolved by Louis Pasteur.

he forced conviction by actual cures, thereby earning the gratitude of all mankind.

It was thus that Louis Pasteur founded the science of bacteriology and changed

the whole attitude of the scientific world to the problems of disease and food-preservation.

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